THE VETERINARY JOURNAL
AND
Annals of Comparative Pathology.

FEBRUARY, 1888.

THE CAUSES AND CHARACTER OF SO-CALLED AUSTRALIAN STRINGHALT.*

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THE fact of a special meeting of your Society being held to-day for the purpose of discussing this important subject, is sufficient proof that none of the causes to which this peculiar disease has been ascribed have been accepted as entirely satisfactory.

A careful examination of the supposed causes will show that a great many discrepancies and inconsistencies will have to be cleared up before scientific men will accept any of them as final.

In the present paper I propose to submit each theory to the impartial light of reason, with the view of seeing how far they coincide with facts.

By far the most important theory which has yet been promulgated, is that the disease is due to the irritation of intestinal parasites. Mr. Stanley, F.R.C.V.S., of Sydney, was the first to advance this explanation, and it has since been confirmed in a most remarkable way by Mr. W. Allen.

The periodical return of Stringhalt at a certain season of the year, namely, during the months of January, February, and March, gives some colour to the parasite theory; but it must be remembered that these three months are the hottest and driest of the year, and are consequently the least favourable to the reproduction of these creatures. It is also maintained by the largest majority of horse-owners who have had experience of the disease—and this is also borne out by my own observations—that the disease is more prevalent during seasons of drought.

If Stringhalt is due to the irritation of intestinal parasites, how is it that it is not sometimes brought on by the irritation caused by

* A paper read before the West Bourke Agricultural Society, Melbourne Australia.

accumulations of sand and other foreign substances in the intestines, which must, in many instances, be quite as great, if not greater, than that caused by worms?

Assuming the disease to be due to irritation and reflex nervous action, it would be reasonable to suppose that the thoroughbred, which has the most highly developed nervous system, would be the most susceptible. Is this so? I venture to say that, if you turn a mixed mob of horses into what Mr. Stanley would term an infected paddock, the draught horses and half-breds would be the first to become affected.

Horses under three years old seldom become affected with Stringhalt, while they are the first to succumb to worms. Horses frequently die from the effects of worms without having shown a symptom of Stringhalt. A short time ago I made a *post-mortem* examination of a draught horse, at Brunswick, which had died from rupture of an aneurism of the aorta, caused by the strongulus armatus, and the large intestines were full of these worms. The horse had been carting heavy loads of road metal the day before it died, and had shown no signs of ill-health.

In the April number of the VETERINARY JOURNAL Mr. W. L. Williams, of Bloomington, Illinois, describes nine cases in which these wandering parasites caused death in horses, but there were no symptons of Stringhalt exhibited in any of them. In his concluding remarks, he states that out of this number there was only one aged horse. Six cases occurred in animals under two years old, and one a foal only two months old. With regard to the symtoms, he states that we note usually a dull, extremely agonising pain, without that violence usually observed in Colic, and there is a want of those characteristic periods of relief.

If due to worms, how can we account for such a small percentage of the horses in a given paddock usually becoming affected with the disease?

Horses are frequently brought in from the paddock, apparently quite well, and after being well fed and cared for for a day or two Stringhalt suddenly developes. The disease is not confined to low-lying, damp situations, which are best calculated for the reproduction of worms. Horses recover when left in the same paddock where they acquired the disease, notwithstanding their liability to re-infection; and it is only seldom that the horse ever has a second attack.

Horses, when turned out of the stable even in the driest and hottest season of the year, and on the soundest country, will often acquire the disease in from a week to a fortnight, and the symptoms remain about the same for weeks and months as they were the first day the horse was noticed to be ailing. If this is

due to becoming infected with intestinal worms, which increase and multiply with such enormous rapidity, how is that the symptoms do not show some relative proportion to such increase?

Mr. Stanley, when speaking about this wonderful power of reproduction, and the great number and variety of worms sometimes found in one animal, mentions the case of a two-year old colt, recorded by Krause, which contained the following list:—500 ascarides, 190 oxyurides, 214 stronguli armati, several millions of stronguli tetra-canthi, 69 tape worms, 287 filaria, and 6 cystecerci. Does it not seem somewhat singular that this unfortunate animal did not have Stringhalt?

For months past—in fact, ever since Mr. Stanley's theory was first promulgated—I have made a large number of *post-mortem* examinations, both of horses that had been affected with Stringhalt, and others that have been slaughtered for the *carnivoræ* at the Zoological Gardens, with the view of ascertaining the relative proportion of worms in each. The result of these investigations has been to convince me that, taking horse for horse, worms were decidedly more numerous in horses that had never shown a sign of Stringhalt.

With regard to the kind of worms discovered, I can safely say that I have found no worms or intestinal parasites that are not common in other countries, and which I have not found equally abundant in horses in England, where this form of disease is unknown. I have here specimens of the parasites I have discovered, and it will be readily seen, on reference to any recent English work, that they have their representatives elsewhere.

I should, however, state that while the species of worms found in horses affected with Stringhalt, and others that had never had the disease, were identical, in every other instance, the tape worms produced (the *Tænia mammillana*) were found in those horses that had Stringhalt at the time they were destroyed; but, as these worms are equally common in other countries, no importance can be attached to this circumstance.

With regard to Mr. Allen's discovery, I may state in passing that I have not seen anything like the parasites he describes in any of the *post-mortem* examinations I have made; nor any trace of their ever having been present in any of the tissues, although carefully looked for with microscopic aid. If they occur in such numbers, and are of the character described, I fail to see how an animal could possible recover from the effects their presence in such situations must inevitably produce, before they could be ultimately removed from the animal's system. As it is impossible from their size that they could bore their way through the blood vessels and enter the circulation without causing fatal hæmorr-

hage, it is difficult to account for the possibility of their return to the intestinal canal from such situations as the pasterns. In Mr. Allen's paper, or at least in the report, it is stated that Mr. Allen made *post-mortem* examinations for the purpose of ascertaining how they got there. Perhaps he will be good enough to enlighten us.

It will not detract from the credit of Mr. Allen's discovery, if I state that I cannot personally give credence to it until I have had ocular demonstration.

Mr. Allen is in error about Stringhalt not occurring in animals pastured near the coast. One of the worst cases I ever saw was a four-year old colt, bred and reared on the sand hummocks on the coast between Bridgewater and the Glenelg. This horse was so bad that the owner gave me permission to destroy him. The *post-mortem* revealed about half-a-dozen intestinal parasites.

Mr. Allen also states that horses affected with Stringhalt pass worms from day to day. I have had a black mare under observation in the hospital for the last three months, and, although the droppings have been examined carefully every day, not a single worm of any description has ever been noticed to come from her.

This mare had only been ailing a fortnight when she was admitted to the hospital, and the first thing I did was to give a strong course of worm medicine, which did not have the slightest apparent effect, either in regard to the expulsion of worms or removal of any of the symptoms of Stringhalt. The mare was so bad that she could not get up for weeks without assistance, nor walk out of her box to the water-trough.

THE DANDELION THEORY.

I still hold the same views in regard to this that I held when my first report was written, and will quote the arguments I then used against it:—

"The plant to which the disease has been so frequently attributed is not, however, the true dandelion, but the *Hypochæris radicata*, commonly called flatweed or cat's ear.

"This plant is abundant in scores of paddocks where Stringhalt is unknown.

"The disease is frequently acquired where no flatweed exists.

"Horses sometimes acquire the disease in the stable, or when partially stable-fed, when they have no opportunity of getting the weed.

"Horses affected with the disease recover when left in the same paddock where the disease was acquired, and also when removed to paddocks where the plant is more abundant.

"Horses may have been pastured in the same place for months

or years, without any sign of the disease, and then, all at once, it makes its appearance.

"The plant has no poisonous properties. If it had, foals suckling their dams would be likely to become affected, the milk being the first secretion to become affected by an improper diet."

Why does not Stringhalt exist in countries where the flatweed came from?

RHEUMATIC THEORY.

That the disease bears some resemblance to Rheumatism there can be no doubt; and when it was first brought under my notice, and in the absence of personal observations, I was inclined to accept this as being the most probable explanation. Subsequent investigation, however, soon convinced me that the analogy does not go far before serious obstacles are to be met with. I need only mention one or two points to convince you that this theory will not hold water.

Rheumatism is known to be brought on, in a large majority of instances, by sudden alternations of the temperature of the body, which causes a check to the perspiration, etc.

If Stringhalt were identical with Rheumatism, it would have to be accounted for in a similar way. The fact that stable-fed working horses are of all others most exposed to these sudden changes and chills, and are least liable to become affected with Stringhalt, should go a long way to prove that it is altogether a different disease.

Rheumatism is not characterised by any exaggeration of voluntary muscular movements, the reverse of this being the rule.

It is highly improbable that hot days and cold nights, which have frequently been referred to as having a probable influence, would have the effect of acting upon different individual animals in this particular manner, and not be manifested in some other way among the rest of the mob. To better illustrate my meaning: Suppose each individual in this room were to lie out all night in the nearest paddock. The exposure would not affect us all in the same manner. I venture to say some would have congestion of the lungs or liver; others Rheumatism; whilst some would perhaps have congestion of the kidneys or inflammation of the bowels, and some probably escape any serious ill-effects. If, therefore, Stringhalt were due to sudden alternations of temperature, I maintain that other effects of this would be found concurrently with it, which, so far as I am aware, is not the case.

ERGOTISM THEORY.

Another explanation that has been offered, and I believe Mr.

Hill, M.R.C.V.S., of Christchurch, N.Z., was first to start the idea, is that the disease is due to the animal obtaining a quantity of ergotised grass.

Ergot is a peculiar vegetable fungus or spur-like growth called the *Claviceps purpurea*, which forms upon the stems of plants, especially the cultivated grasses.

In my first report, I stated that Stringhalt followed in the wake of agriculture, and that it was always most prevalent on lands that had been cultivated, or were in close proximity to such; and, as I have yet no reason to make any serious departure from this statement, there would appear to be some solid ground for further investigation, especially as there is nothing in the symptoms or nature of the disease which might not be directly or indirectly due to ergotism. What appears to me to be the most fatal objections to this theory are that cattle and sheep are just as likely to become affected with it as horses. It is also a most frequent cause of abortion, which, so far as I am aware, bears no relationship to Stringhalt. In other words, there is no evidence that abortion accompanies Stringhalt.

Until we are able to produce positive proof of the actual cause or causes of a disease, I hold that the next best thing we can do is to prove what it is not due to, and this has, to a great extent, been my policy throughout.

Whether I have succeeded in convincing you that any or all of the supposed causes I have mentioned are based on erroneous premises, remains to be seen.

It may be possible for someone to stumble accidentally upon a correct solution of the mystery, but the surest way of leading to the discovery of the cause is by endeavouring to correctly interpret the effects produced.

If a theft has been committed and the thief is unknown, the detectives at once set to work to ascertain the nature of the theft, and if suspicion is cast upon anyone, the individual is examined, and, if found innocent, search has to be made elsewhere. In like manner in dealing with diseases, the causes of which are unknown, we have to work backwards inferentially from effect to cause, and it must be at once apparent to any intelligent mind, that if we give a wrong interpretation to the effects produced, we are at once thrown out of the proper course of our inquiry.

I am convinced in my own mind that a good deal of misconception has taken place in regard to the true character of the disease in question. For example, Mr. Stanley in his official report states, under the heading "Nature," "that it is a local nervous affection characterised by an involuntary spasmodic action of the muscles of both hind legs." Others have previously described the disease as

being identical with Chorea, or St. Vitus' Dance as it is commonly called.

I hold that in the correct acceptation of the term, the characteristic jerking up of the hind legs in not an involuntary muscular action, and it is of the greatest importance that this should be distinctly understood.

When Mr. Stanley was in Melbourne a few months ago, we had some discussion in reference to this point, and he maintained that it was only a matter of hair-splitting. To my mind there is just as much difference between a voluntary and an involuntary muscular movement, as there is between a sane man and a lunatic. You have all seen dogs affected with St. Vitus' Dance after a severe attack of distemper. The peculiar twitching of the muscles takes place whether the animal is sleeping or waking, and notwithstanding the pain and weariness caused by the frequent repetitions, the animal is totally unable to resist them.

I have watched horses affected with Stringhalt for hours, and have, as before stated, had one affected with the worst form of the disease under observation for three months, and have never witnessed any involuntary muscular movements. The spasmodic snatching up of the limbs in the affected horse is merely an imperfect response to involuntary movement, which only occurs when the horse desires to move the limb; consequently, it bears no analogy whatever to the muscular twitchings in St. Vitus' Dance. It is true that when the horse is standing, and has apparently no desire to move forwards or backwards, or even to either side, he will frequently snatch up one hind foot and the other quickly afterwards; but it must be remembered that the wasted condition of the muscles, and the consequent unnatural position of the limbs, cause the animal to frequently want to change the weight from one limb to the other, and that it is impossible for him to lift his hind foot, except by a sudden jerk. This sudden spasmodic movement of the limbs is due to a want of co-ordinate action between the different sets of muscles which control the natural movements. The muscles at the back part of the leg are more wasted than those in front, and are consequently in too weak and flabby a condition to counter-balance the muscles in front which flex the hock, and instead of a natural, well-directed movement, the foot goes up with a bang, on the same principle that an unevenly balanced see-saw would do.

A careful analysis of the symptoms and *post-mortem* appearances convinces me that the wasting of the muscles is due to want of nourishment, as they are reduced in volume, pale in colour, and flabby to the touch, but readily resume their tone and volume when recovery takes place. The disease is, therefore, functional, and

not organic, in the first instance. I am well aware that in old-standing cases other complications arise, such as rupture of the ligaments of the joints, absorption of the articular cartilages, accumulations of gelatinous-looking substances between the muscles, etc., etc. But these are all after effects, produced by the unnatural position in which the limbs are placed, and the exaggerated movements they are called upon to perform.

Although this disease occurs in two or three forms, which were minutely described in my first official report, these bear sufficient resemblance to each other to be readily identified as modifications of the same disease; consequently it is unnecessary to enter into any further detail here.

This singular uniformity in the general characteristics of a disease, which occurs under such a variety of circumstances and surroundings, renders it extremely difficult to discover anything like a similar uniformity of any particular condition or circumstance under which animals acquiring the disease are placed.

Stringhalt is met with under almost every variety of soil, locality, and situation which can be found in the colony. It is found on rich alluvial flats, and on dry sandy ranges, on limestone, basalt, and sandstone formations, on chocolate soils, and on clay soils. It occurs in well-wooded, sheltered situations, on the bleak, open plains, and on high, bare hills, on coast land and in inland valleys.

I am now going to drop the term Stringhalt altogether, for it has been recognised on all hands to be an erroneous one, and tell you that almost as many cattle are affected with it as horses, and that I believe the disease I was sent by Government to investigate in the Western District to be due to the same cause or causes.

It affects animals of all ages, but adult animals are by far the most susceptible. There is, therefore, so far as we have gone, no uniformity in any of the circumstances which accompany it, or to which we can in any way attribute its production.

There are, however, some features and conditions which are almost, if not invariably, present, and to these and others which may yet be found to exist we must look for the probable cause.

The most important point for our consideration is the fact, that it is during the three hottest and driest months of the year that the disease makes its appearance, and that at any other time horses and cattle may be turned on infected country with comparative safety. It is true that now and then a case may occur a few weeks earlier or later than the time mentioned, but these exceptions only prove the rule. As already stated, this is the hottest and driest season of the year. Heat and drought may therefore be regarded as constant attendant circumstances. The only other

condition that occurs to my mind at present as being an almost equally constant accompaniment in all districts where the disease is found, is bad water. The heat and drought cause animals to require a large quantity of water when the supply is the lowest and the quality the worst. At this season of the year the water-holes, which are the only sources of supply in most districts, are the most perfect nurseries for all kinds of infusorial and germ life. The constant evaporation and the frequent visits of thirsty animals, tends to still more concentrate their decaying and living contents, and the mystery to me is that we do not have more diseases than have yet been discovered.

I have known cases of the disease under question to have occurred in places where animals had access to running streams; but these so-called streams are little better than stagnant pools, the water at this season being warm and impregnated with animal and vegetable matter, in a state of decomposition and full of organic life.

The conclusion I have arrived at after a somewhat lengthened inquiry is, that this disease, like many other enzootics, is due to the introduction into the animal's system of some minute germ or bacillus, which lives upon and multiplies within the blood, and after a certain period is passed off by the various emunctories of the body; while it is in the blood, it so alters the composition of that fluid that it is incapable of giving the necessary nourishment to the more remote parts of the body, and so the muscles of locomotion are not in a fit state to respond correctly to the direction of the will.

Whatever this *materies morbi* or disease-producing element may be, it is evident that it remains for a considerable period in the animal's system. Dozens of horses, as well as cattle, show no signs of disease when they leave the paddock, but when they have been ridden or driven for a distance it suddenly developes. This may occur in horses when being brought in from the paddock, or after they have been in the stable for a week or more. The performing a journey or doing work may, therefore, be looked upon as the exciting cause of the disease. This is not always necessary, however, to produce it, as many horses become affected in the paddock without being put to work. In these cases it is evident that the disease-producing element is sufficiently abundant in the animal's system to give rise to the well-known effects, without any particular exciting cause. It is also quite probable that horses that escape having the disease, although running in the same paddock, and being placed under precisely similar circumstances to those which develope it, escape only because there is an absence of any exciting cause.

I believe that in many cases we could develop it in at least half

the horses in any given paddock when the disease breaks out, simply by submitting them to severe exertion and then turning them out again when sweating.

The muscles of the thighs are often observed to be slightly wasted before the characteristic spasmodic action of the limbs or knuckling over at the fetlocks is noticed. It is also evident that, whatever the primary or predisposing cause is, it remains latent in the system for a certain limited time, and then passes off, and there is no further danger till the following season. This, to my mind, points emphatically to some disease germ which enters the blood to reproduce and pass off again, leaving on some animals effects which take months to recover from; whilst others apparently none the worse for having acted the part of travelling nurseries.

I trust the few scattered reflections which I have attempted to focus have not been uninteresting, and that the hurried glance we have cast over both old ground and new may be of some benefit.

I could write and say a great deal more on the subject, but will not trespass further on your time.

IS TETANUS A CONTAGIOUS DISEASE?

BY A. JOHNSTON, M.R.C.V.S., PERTH.

A RECENT instance in my practice has caused me, like the Editor of the Journal, to "waver in my opinion" that Tetanus was non-contagious.

It is my experience that I have rarely had a solitary case of this great bugbear of a practitioner's life. As a rule several cases, even miles apart, have occurred about the same time, giving an epizootic appearance; but the following facts are new in my experience:—On 15th December a horse was brought to me for advice; he had brought an empty cart a distance of over two miles. I had no difficulty in diagnosing Tetanus, especially as I had had the horse under treatment exactly a month before for suppuration of the sole of a hind foot, the result of a gathered nail. Of course, I could not allow the horse to take home the load for which he had come in, so a mare was borrowed from a dealer to take his place. All the horse's harness, *except the collar*, was transferred to the mare, and she took home his load, and was put into his stall. In two days she was sent home with her shoulders slightly abraded. On the 23rd I was called to her, and found her in a moribund condition from Tetanus. She was destroyed as an act of mercy on the 26th.

The horse is making a good recovery. If the disease was communicated to the mare from the horse, one point is settled, viz., that the period of incubation is short, as the mare must have been ill a day or two before I saw her.

SURRA; OR PERNICIOUS ANÆMIA IN THE LOWER ANIMALS.

BY R. W. BURKE, M.R.C.V.S., A.V.D., JUBBULPORE, INDIA.

(*Continued from p.* 12.)

The explanation which on many grounds has recommended itself, as accounting more satisfactorily for the phenomena observed, is that the injurious effects produced by bacteria are due, not only to what they take or what they excrete, but what they leave in different cases, and this is closely associated with the imperious demand they make for oxygen. The *bacilli anthracis* being ærobic, they must obtain the oxygen they require for the process of life from the tissues by which they are surrounded; and when oxygen is withdrawn from such complex compounds as those which occur in an animal's tissues, after an apparent fictitious improvement, the elements enter into new combinations, and then, under the name of ptomaines are believed to be the really poisonous agents. An animal's body is capable of resisting the action of such foreign agents probably better than that of active and living organisms, and so long as the poisonous chemical agents do not occur in excess, only partial or modified harm comes from their action. Principal Veterinary Surgeon Oliphant, in his D. O. dated Umballa, Dec. 21, 1886, observes—"Formerly only such cases as died were considered as Anthrax, whilst numerous other cases occurred at the same time, which went unrecognised. Veterinary Surgeon Mann was one of the first, if not the first, to bring this prominently to notice, and in an outbreak here, in N.B. Royal Horse Artillery, last year, in which the most careful taking of temperature of *all* horses was carried out, only a comparatively small percentage of deaths occurred, *and these principally in the beginning.* In the late outbreaks at Rawulpindee and Multan, the nature of the disease was clearly set at rest by demonstration of the *bacillus anthracis* under the microscope."

And now a few words on the subject of the parasites in Surra, for it expresses all of general importance regarding the pathology of the disease. Does Surra depend on the presence of the parasites in the system, or is it the result of a combination of many evil influences, among which may be mentioned impure air, stagnant water, and impure food-supply? That it is directly produced by

the action of the parasites, we conclude from the evidence produced by Dr. Evans in the first instance, the disease having been conveyed by inoculation to at least three animals; while other evils I have enumerated above may be regarded as intermediate causes of outbreaks of Surra. These influences probably predispose the animals to an attack of Surra, as well as favour the growth and spread of the parasites. However, one part of the evidence with regard to the action of the latter is incomplete. It has not yet been shown, although it is believed, that they alone cause the disease when inoculated into healthy animals after cultivation, apart from the blood in which they are witnessed. Nor is it certain that their action is in any way analogous to that of bacteria. It has not yet been shown at least how bacteria produce their injurious effects upon the system; it is probable that they do so in a manner which is different to that of parasites higher in the scale of development, as, for example, those of Surra, and other helminths causing disease. The action of the Surra parasite is described as that of "tearing," "dragging," or "tugging" at the blood-corpuscles. Is the action of the stongylus armatus any different on the mucous coat of the intestines and intima of the blood-vessels? It is clear, however, that the action of bacteria cannot be compared with that of the latter.

I think it is desirable, whilst fully admitting that Surra is communicable by inoculation, to inquire whether this power of communicability is limited to experimental inoculation or to simple contact as well. All experience proves that this disease is communicable only by inoculation, and is *not* contagious in the ordinary sense of that term. The ordinary form in which diseases caused by bacteria are produced is by contagion, whether due to simple contact or that resulting from experimental inoculations. The ordinary form of disease due to bacteria may occur independently of experimental inoculations. Surra has never been found to occur independently of such inoculations—that is, as the result of contagion from affected animals. And this is an important difference.

Now, these experimental successes in Surra, though they are very interesting as such, are still more so as evidences of an invasion by a parasite which is much higher in the scale of development than bacteria, producing a *less rapidly* fatal type of disease than that caused by the latter. These observations with regard to the differences in the contagiousness of these two diseases may not be without significance in the history of Surra.

It is very desirable that further inoculation experiments should be made, not only with blood containing the parasites, but with the parasites alone, obtained after cultivation, and, when an op-

portunity occurs, as frequently does in India, of trying similar inoculations with material obtained from this disease witnessed in man.

There is a vague impression regarding the subject of Anthrax Fever in the horse, that it is a malady from which recovery is nearly impossible. I think that nothing disproves this belief better than the observations recorded in practice itself, for nothing is more erroneous than to suppose that Anthrax is any more fatal in its effects than are other specific fevers. It is not nearly so fatal (as experience proves) as Surra seen in the lower animals; for, to quote a first impression of Mr. Steel, who witnessed an extensive outbreak of this disease in Burmah ponies, Surra may be characterised as an "*invariably fatal*" disease. Dr. Evans' experience was the same. He says,* "The records of the 4th Punjab Cavalry show that no case entered on the sick list for this disease has ever recovered. A few cases have made slow progress in the disease, alternately getting better and worse for over a year, *but they never recovered.*" It is, of course, an essential difference, but I am convinced that this difference is sufficiently marked in most instances to allow a ready diagnosis being made between the two diseases.

The extreme fatality peculiar to Surra which I have just described may be regarded as specially diagnostic of a typical outbreak; but in those cases in which the course is *indefinitely* prolonged—and which is a phase of Surra perhaps less characteristic than the former—parasites are also present, and it is noteworthy than in some of these at least the severe and dangerous symptoms seem to supervene of a sudden, and more rapidly than in those more acute in character in the beginning—evidently because in the one case the system is more weakened by the injurious effects of a long illness, than in other cases of a less prolonged nature. As a general rule, it may be stated that, if the mischief have not proceeded beyond the stage at which medicinal treatment has any effect, recovery is more likely to follow, in the milder cases, if proper treatment be adopted at an early stage of the disease, and the animals removed at once from the place in which they were located, and if they be supplied with water obtained from a fresh source.

Beri-Beri in man (*Lancet*, October 22, 1887) is probably the same disease as Surra in the lower animals. It is described as occurring under two forms—one which is marked by paralytic symptoms, the other in which a dropsical condition predominates, the same as in Surra seen in the lower animals. The *Lancet* recently published a full account of the malady which is known as Beri-Beri

* Evans, "Report on Surra Disease," 1880.

in many parts of this country, to which reference may be made for its peculiar characteristics, "the most constant and striking of which is the Progressive Anæmia." What medical experience and research have indicated, veterinary investigation appears to confirm, as may be observed on an inquiry into the history of Beri-Beri and Surra respectively. There is every reason to believe that, in a few years, important changes will be effected in the nomenclature of animal diseases which once seemed complicated or obscure. The importance of correct nosology in disease, it would be difficult to over-estimate, not only on account of its bearings on pathology, but because of the influence of treatment upon our animals, should the nature of the disease be not rightly understood.

We shall speak in future of one disease—Pernicious Anæmia: *Surra, Beri-Beri, Kákke, or Burmah Disease, South Wales Epizooty*, etc., being merely synonyms. Like Pernicious Anæmia in Europe, Surra has two forms. In the acute form it is *very fatal*, but in the milder and more chronic form recovery sometimes takes place.

The opinion which we ventured to put forward in our "Equine Diseases of India," published some months ago, regarding the pathology of Surra, that it would be found to be Pernicious Anæmia proves to have been correct. Now that we know something of the pathology of this great scourge of India, we may look forward to at least better results from our endeavours at treatment in the future than we have witnessed heretofore.

COCAINE.*

BY J. E. RAYEN, VETERINARY COLLEGE, TORONTO.

COCAINE is the name applied to a local anæsthetic concerning which, during the past year, numerous articles have appeared in various medical and veterinary journals; and if it proves as valuable as many who have used it are sanguine it will, it is truly a valuable addition to the list of materials used in operative surgery. It is obtained from the leaves of *Erythroxylon coca*, a shrub cultivated on the slopes of the cordilleras of Bolivia, Peru, and Columbia. They resemble the leaves of the tea, but have a slightly-visible curved line on either side of the prominent mid-rib. They are about two inches long, oval, oblong entire on the margin, usually blunt and emarginate, with a small apiculus in the notch at the apex.

* A Paper read by J. E. Rayen, veterinary student, Ontario Veterinary College, Toronto, Canada.

The leaves are thin and smooth, and have a bitter, aromatic taste. They contain a yellowish-white crystalline alkaloid—cocaina or cocaine—which has a bitterish taste, and crystallises in shining monoclimes prisms. It requires 704 parts of water to dissolve it; is freely soluble in alcohol and ether, and one in twenty respectively in melted vaseline and castor oil.

For the above description I am indebted to Gresswell's excellent little work on "Veterinary Pharmacology and Therapeutics."

Physiological and Medicinal Actions.—Coca-leaves have been much used by native Indians and others, travellers and miners, to appease hunger and thirst. It has been found that they enable a greater amount of fatigue to be borne with less nourishment, and lessen the difficulty of respiration in ascending mountain sides.

They are stimulant to the nervous and muscular systems, and prevent rapid waste of tissue.

The physiological action of coca and its alkaloids are summed up by Dr. Bennet as follows:—

1st. In small doses not ending fatally, cocaine causes partial loss of sensibility.

2nd. In doses which are subsequently fatal, it produces, prior to death, general loss of sensibility.

3rd. It destroys the excitability of the posterior columns of the cord, and paralyses the entire system of peripheral sensory nerves, but the anterior columns and peripheral motor nerves remain intact.

4th. It induces spontaneous convulsions; but unlike those produced by strychnia, they are not excited by peripheral irritation, owing to paralysis of the sensory nerves.

5th. Special experiments prove that the nerve endings in the skin and mucous membranes were rendered inexcitable apart from any action the drug had upon the nerve centres.

Coca is believed to possess stimulant, restorative, or even nutritive properties, enabling persons who chew the leaf to undergo great muscular exertion with little or no fatigue. The pupils are dilated, respiration rises in frequency, is disturbed in rhythm, and finally ceases. The heart is greatly accelerated by paralysis of the vagus. The blood pressure first rises, and then falls. The muscles themselves remain unaffected. The amount of urea is said to be diminished, as if from diminished metabolism, but coca does not prolong the life of starved animals.

It has been used to prevent muscular exhaustion in wasting attended with increased formation of urea (Azoturia), in convalescence, in mental exhaustion, and in the opium habit; but in some of these uses it has somewhat disappointed expectation.

Neiman, as far back as 1860, wrote that cocaine produced temporary anæsthesia of the parts of the tongue with which it came in contact. But this interesting fact seems to have lain dormant for twenty-four years, until a few months ago Herr Koller was led to test the local anæsthetic action of the hydrochlorate of cocaine, on account of the effect he had witnessed when cocaine was pencilled upon the pharynx to render it less susceptible in laryngoscopic examination. Cocaine is a mydriatic; it slightly raises the temperature, and quickens the pulse and respirations. After Herr Koller's discovery, Dr. Brettaner, of Trieste, demonstrated its valuable anæsthetic properties on the eye, September 16th, 1884.

It was shown that when two drops of a two-per-cent. solution were placed on the cornea, and the application repeated after an interval of ten minutes; at the end of ten minutes more the sensibility of the cornea was so far diminished that it could be pressed with the probe, and the conjunctiva seized with fixation forceps without causing notable discomfort.

It has been shown that cocaine produces these effects not only on the throat and eye, but on the ear, tongue, nose, larynx, trachea, urethra, rectum, and even when absorbed by the unbroken skin.

The salts of cocaine are the hydrochlorate, citrate, and salycilate. Of these the hydrochlorate is most used. It appears as a white amorphous powder, which in reality consists of slender white needles, usually having a peculiar odour, more marked than that of the alkaloid itself, and its action is more intense than that of the alkaloid. Its greater solubility renders it more acceptable, as it is readily soluble in four parts of water, and freely soluble in spirit. It is an antiseptic; a five-per-cent. solution delays the putrefactive changes in an extract of meat.

As a local anæsthetic, I have assisted in using it in several cases—one in removal of the lateral cartilages, again in neurotomy. Ten minutes before the operation one-half dram of a four-per-cent. solution was injected as near as possible to the course of the internal and external plantar nerves, producing complete anæsthesia in both cases. In the case of neurotomy the nerve, after being exposed, could be completely crushed between the points of the dissecting forceps without the animal evincing pain. I have used it myself in two cases, in one for removing a small fibrous tumour from the eyelid, and in this case its action was highly satisfactory. I injected a few minims in several places around the base of the tumour, and after thoroughly washing the cutaneous surface over the tumour, painted it by means of a camel-hair brush with the solution, introducing at the same time several drops into the eye.

The skin was then cut and dissected back without the least symptom of pain. The tumour was then easily removed, playing on the cut surface meanwhile by a spray of the same solution.

I have used it in but one other case, that being a case of Conjunctivitis produced by the barbed glomerule of a grain of rye. The eye was terribly inflamed and sensitive. Although the operation could have been performed without the use of cocaine, as I had it handy I decided to use it. A spray was thrown upon the conjunctival membrane at intervals of several minutes.

In about ten minutes the barb was easily removed without the animal evincing the least pain, the complete absence of which greatly facilitated the operation.

One of the questions which naturally presents itself to the student is—Is the use of cocaine detrimental to the healing process?

Although different opinions have been expressed, the majority have been favourable. Among the cases which have been reported as resulting unfavourably several were for the removal of malignant tumours, where such a result might reasonably be expected. The others might possibly be traced to a scrofulous diathesis, or improper care. So far as my own experience goes, I have noticed no untoward results, the wounds apparently healing in a natural manner. Some operators have gone so far as to assert that it actually expedites the healing process.

The obstacle to the general use of cocaine is its great cost, but increased demand will certainly bring about increased production, and with this, it is to be hoped, a reduction in price. However, quality should not be sacrificed to mere cheapness; and as in so valuable an article the temptation to adulterate is great, the drug should be obtained only from reliable dealers.

Although cocaine will probably never replace the general anæsthetics in the major operations of surgery, I believe it is destined to be generally used in the minor operations. It increases both the safety and facility with which the operation can be performed, and either mitigates or completely removes the suffering of the animal, and it only remains for the members of the veterinary profession to demonstrate in a practice which affords every facility for experiment, the many purposes for which this valuable agent may be used.

EQUINE GLANDERS.

A Resume of Facts and Observations relative to the same.

BY F. C. MAHON, M.R.C.V.S., SOUTHSEA.

This important malady is essentially an equine affection, as in the horse we find its most extensive ravages, mortality, and propaga-

tion; though, as is well known, the ass, mule, goat, etc., prove occasional victims, the ass particularly, when affected, presenting the typical lesions and diagnostic symptoms of the disease. The advent of the "Germ Theory" has placed Glanders on a level in importance with two other direful and extensive diseases, viz., Anthrax and Tuberculosis (Consumption); the former chiefly affecting the domesticated animals, and propagatable with fatal results to mankind; the second affecting the domesticated animals also, and recently brought into due importance by its hitherto ill-suspected extent and fatality, now proven to be communicable from animal to man by milk and the ingestion of meat as food, provided the latter be only subjected to a minor degree of heat.

The doctrine of the spontaneous origin of Glanders has now happily but few votaries; for no one can rationally deny, who has given much thought and had extensive experience, that the origin from the beginning of a potent poison—by recent discoveries and investigations—must now be relegated to the micro-organic world. This discovery, promulgated in 1882 by Weisering and Köch, started into new life the pathology of the disease, which is too rife, too important in many particulars to be lightly considered. That extraneous influences hold marked sway is not to be denied—faulty sanitary and hygienic arrangements, often found even in our day, though the diminution in loss has been wonderful since more correct principles of light, ventilation, and temperature have been in the ascendant. Soil, I maintain, proves a veritable nidus for propagation, and also that hot, dry seasons are causes aiding greatly in the mortality and virulency of the virus of Glanders. That there are exceptions no one can satisfactorily deny. Sea air, beneficial in many diseases, in the cases now to be considered had little or no effect. An outbreak of a serious and extensive character took place here so far back as April of last year, spreading and causing death, with enforced destruction, to the succeeding months of May, July, and August of the same year; and where, contrary to warning, opinion, and experience, the owner refused to believe. The advent of a black mare, aged seven, a recent importation from Wales, proved the chief cause, though other imports into the remaining stables at the same period heightened the severity of the disease and produced further extension. That any but the mare were affected, observation counted for little, subsequent investigation and deductions much, in its elucidation. Two days after her arrival, on being put to work in a 'bus, she evinced unusual signs of fatigue, had a slight cough and did not eat with ordinary vigour. No nasal discharge; slight exaltation of temperature (100½° Fah.); respirations 22, pulse 43. The average temperature continued the same for three

weeks, when a rise to 103° Fah., with other marked features in connection with the visible mucous membranes drew especial attention to her condition. A careful examination now revealed Glanders in a chronic and, as proved, an exceptionally occult form, but decided opinions were held as to its being Nasal Gleet, even Strangles; but both views were proved to be erroneous, as a *post-mortem* examination revealed a beautifully developed example of Glanders. That the peculiar range of temperature, few, but characteristically developed nasal lesions, marked plethora, good, occasionally a voracious appetite, no great discharge from either nostril, coat glossy, submaxillary glands *hard, knotty*, adherent to the rami of the inferior maxilla, and inclined centrally, gave rise to doubt among the few was proved, but that we are too often deceived as to the nature of the malady is self-evident. No case at the Royal Veterinary College noticed by me, either in history or development, approached this one closely. Beyond stimulation to the submaxillary and parotid glands, and medicinal agents internally, as Syr. phosph. ferri et quinæ, alternated with Ferri sulph. et nucis vomicæ as powders, one daily, no further treatment was pursued. The owner being reluctant to have her destroyed, or to inoculate an ass with the nasal or other discharge, isolation was carried out more rigidly than before, she being removed a mile away from any others of the same stable.

There were remarked the advent, decline, subsequent renewal of the chancre-like ulcers, bluish discoloration around the veins of the septum nasi, yellowish-white agglutinated discharge, faintly green at early morn, œdema of the face, glassy appearance of the eyes, corded lymphatics of the facial region, mucous râle (tracheal), marked *bruit*, with second sound of the heart (with concomitant murmur), dull sound in patches over the left lung, increased in others, with general anæmic murmur of the right lung, increase of urine—watery, highly albuminous—glossiness of the coat more marked, increased appetite, which somewhat abated seven weeks after first noticeable symptoms and four days before slaughter took place. The development of the ulcers in the left nostril appeared periodically, usually every third day, remaining quiescent for a day or two, then becoming coated with glairy mucus, and greatly absorbed, to be followed on the original spot by others, larger, when two or more would coalesce.

The finger passed over the septum sunk into many pit-like depressions, which were, owing to the muco-albuminoid deposits, filled up, hence non-visible to the naked eye. The cartilage during life could not be found, as far as was visible, to be structurally much affected, but on *post-mortem* examination it proved to be involved in the upper region of the nose, and well-marked on the left side.

Callosities of fibroid tissue and specific cicatrices were noticeable. The average temperature of the horses in the same stable was about 100° Fah. In No. 2 stable an aged horse stood, which offered no visible external signs, with the exception, on the septum of the left nostril, of a well-raised, bluish-white cicatrix. He fed well, but the breathing was slow, anæmia well marked of the visible mucous membranes, temperature 102·3° Fah., corded lymphatics of the fore and hind limbs. He was destroyed and found to be affected with Chronic Glanders, lungs particularly showing Glanders nodules and infiltrations, and the lymphatics of extremities infiltrated. A peculiarity in connection with this stable was its subsequent freedom from the disease. In a black mare conjunctival cicatrices of both eyes, of a reddish-brown hue, were well marked. In no other case did this condition exist. Sections of the anterior maxillæ and femur revealed ulcerative patches and pit-like excavations. The trachea presented four ragged-edged, dark brown ulcers, one in its superior third, with infiltration of glottis, and an ulcerative patch—two centrally, and one near the division into the main bronchi, slightly inferior—that is on the base.

It appears evident that the life of the bacillus of Glanders is anærobic. The discharges from the nostril, which often contaminated and surrounded with *débris* from the fodder, denuded epithelial cells, pus, cartilage, "puccinia elements" also, in great measure prove protective; but by deposition on a soil suitable, with decomposion of the liquid portions, etc., the bacilli spores are set free, and oftentimes drying, become media for propagation and further imbibition.

The question of the extractive theory of bacterial life ought likewise to be here considered, the leucomanes and ptomaines: Do they exert any influence in the progress or retardation of the Glanders bacilli?

With the fixed infecting virus is attached or associated the specific local manifestations of disease: ulcers, tubercles, pus, blood, secretions, and probably excretions, and all the animal tissues which are permeated by blood or lymph. The volatile—the sweat and exhalations of the diseased—is feasible.

Experiments conducted by Renault and Bouley go far to prove that the incubatory period is shorter by inoculation, the infection of the virus being accomplished intravenously, and that the lungs are the chief seat of pathological changes.

Too often the lesions of Glanders are looked for methodically, as being in the lungs, nasal passages, and in the constitutional symptoms; but in many cases, and those which are not ordinary, primary lesions are met with in the lungs, trachea, and larynx,

the lesions of the nasal membrane being secondary or terminal, and in not a few no lesions have been discovered. Both these conditions were found in cases 1 and 2, respectively recorded. In the mare, from the commencement of the attack, the lungs appeared primarily involved, the callous condition, enucleation of the nodules (pulmonary), after death pointing closely to this being correct.

In No 2 no one could have diagnosed Glanders, Farcy, or Glanders-Farcy; though some would, had they suspected Glanders, or Farcy, have paid marked attention to the solitary cicatrix of a whitish hue, in the left nostril of the gelding. Of the remainder affected and slaughtered, only one was a mare, and in a general summary, and proportionately, one mare to four horses may be the average deduction, though I have not seen any statistics on this score published. No vaginal discolorations existed in the mare, though in Anthrax and Tuberculosis in other animals a congested and anæmic appearance is very often met with. Hot seasons, dry particularly, combined with badly-ventilated, faultily-drained stables, where also much wood is employed in construction, are found fruitful auxiliaries in occurrence of the disease.

The virus of Glanders has been proved to be highly dangerous when in a desiccated condition, and the spores scattered broadcast by the wind alighting on a denuded surface, such as is caused by rubbing in Eczema and Pruritis, a fruitful source of development; add to this the use promiscuously of harness, clothing, grooming tools, even occasional admixture of forage, and the water supply, it is no wonder if these prove sources of contamination, any one of which overlooked may prove a flaw in its prevention.

The propagation by mediate or indirect contact is too often overlooked. Isolation is good, if only the attendants are limited to the charge of the isolated animals—not as here was the case, until perhaps too late, when mischief had been done.

(To be continued.)

A NEW OPERATION FOR THE CURE OF "PUMICED SOLE" IN HORSES, ARISING FROM LAMINITIS.

BY F. F. COLLINS, F.R.C.V.S., LATE PRINCIPAL VETERINARY SURGEON TO H.M. FORCES IN INDIA, DUBLIN.

SEEING an article in THE VETERINARY JOURNAL for December, from the pen of the Professor of the A.V. School at Aldershot, upon the subject of the treatment of "side-bones" by means of isolating the

horn covering the diseased cartilages, has induced me to record my experience in the treatment of feet exhibiting convexity of the sole, or what is commonly recognised as "pumiced sole."

In the year 1870, when quartered in Dundalk, I was consulted by a Mr. Robson, agent to Lord Roden, relative to the crippled condition of once a very valuable four-year-old hunter, that had, by the abuse of a servant some time previously, suffered from Acute Laminitis, and when I saw the case it was one of veritable "pumiced sole." The question was what could be done to relieve the poor sufferer. The horse, if sound, would have been worth a high figure, but as he was, the knacker would have been a charitable consideration.

The owner left the animal for me to do whatever I liked in the matter. It then struck me that by removing the whole of the disintegrated horn, and throwing the weight of the horse on to his frog, sole, and such portion of crust as remained intact, a healthy growth of horn, with a healthy laminal attachment, would follow. Acting upon this belief, and preparing the owner for the many months' idleness necessary, I removed the horse to a shed in a good soft paddock, cast him, and removed the whole of the detached horn, which extended to the coronet at the toe, slanting downwards and backwards to within an inch of either heel.

Of course, the poor animal, when released, could scarcely stand, but his bed was made comfortable for him when disposed to lie down. I carefully examined the feet weekly to note results and watch the effects of nature's restorative powers, and I was pleased to find at the end of eleven months perfectly healthy feet existed. The horse was subsequently sold at a high price, and passed sound by an eminent veterinary surgeon. Since the above occurrence I have had two similar cases to treat, both terminating as the one recorded.

LOSSES AMONG EXPORTED HORSES ON BOARD SHIP AND ON LANDING.

BY R. J. DAWSON, VETERINARY SURGEON, SAN FRANCISCO, CALIFORNIA.

Any person having any knowledge of the exportation of horses, will admit that a large percentage die during their passage across the ocean. A number of my employers have, at different times, gone over to England for entire horses; more especially do I call to mind great losses to people of my acquaintance in Canada, who have gone from that country for that purpose.

It will, perhaps, be good policy to state, under a few headings,

what I consider the principal causes: 1. Condition of horses at time of embarkation; 2. Season—rough or smooth passage; 3. Medical and other treatment on board; 4. Altered conditions on landing; 5. Other systems adopted as to general treatment of stallions.

1. I can plainly trace the death of a number of horses to the fact that they have been fatted and prepared for the purpose of sale, to please the eye of the purchaser. Such animals are generally found in dealers' stables, fed upon soft food. They sometimes travel quite a long railway journey to the place of shipment. They prance along in high spirits, and when aboard appear in the best of vigour and general condition. But ere they have been on the ocean two or three days, it is very evident that their next journey will be the passage through the salt water to its bottom, to make food for the fishes.

2. It needs little general knowledge of atmospheric matters to understand that the summer is much the best time of the year to cross the Atlantic. If one is lucky enough to have an easy or smooth passage, it is very evident that it is so much the better for the horses.

3. Those who are entrusted with the care of animals on transit are very fond of loading themselves with medicines of all kinds, wonderful "cure alls" for every malady. It seems to me that horses are not troubled with sea-sickness as it is understood as affecting the human subject, but the lungs appear to me much more to sympathise; by far the majority of cases, to my knowledge, have died from inflammation of those organs.

4. In Canada and other cold countries, it is plain that one advantage in landing horses during the summer months is that they are undoubtedly better able to stand the intense heat of a Canadian summer than the cold during winter, and the somewhat gradual change from summer to winter is advantageous.

5. Through a lack of knowledge of the simplest laws of physiology, a large loss frequently occurs to the stock-owner. For instance, I have known Canadian farmers to buy stallions from English farmers, right off the plough, being accustomed to work regularly with the other horses. These same animals, when at their home in Canada, are shut up in a stable where they can get little or no exercise, being much over-fed, and seldom, if ever, exercised. Surely it requires very little reasoning to show the dullest mind that such an altered state of things is very liable to bring about dangerous consequences. A great number of cases of indigestion in stallions have come under my care, the result of the above mistake. Generally about three or four months after landing they give signs of Colic and indigestion. The hay is much

coarser than that in England, but this agrees remarkably well with the native horses, and does not disagree with imported mares. The quantity of grain (oats) given to horses in Canada is very great. Stallions, of course, are no exception to the rule. They have a recognised disease as a consequence of so much consumption of oats, termed "grain sick" or "burnt up." I will admit that when the thermometer is 30° F. below zero it is a hard matter to exercise a horse unaccustomed to the climate. But it is not always as low as that, and even when it is, I maintain that if the animal is adequately clothed, he is better at exercise than freezing himself almost to death in a small loose box. Horses are nursed and "babied" too much. I lay great stress on exercise, because I am certain that much of the trouble comes from a want of it. Some owners have large loose boxes, altogether plenty of room. But I am of opinion that the animals must be "exercised," as if left to themselves they do not take sufficient movement to digest their food and keep the blood in healthy circulation. I suppose this opens up the question as to whether it is the best policy to hack hunters during summer, or adopt the other system of "summering hunters." The two facts, viz., that stallions in this country, as a rule, are put to more mares during the season than in the old country, and secondly, that the summers being intensely hot, may have something to do with the production of so much more Colic in entire horses in Canada than elsewhere; it being an accepted practical fact that exhaustion has much to answer for in causing Colic. These are a few of the causes from which so many imported horses die; but I am doing my utmost to more thoroughly investigate the matter, and shall be pleased to send the results of my inquiries to THE VETERINARY JOURNAL.

ANTHRAX AND HORSE-SICKNESS.

BY H. THOMSON, M.R.C.V.S., ARMY VETERINARY DEPARTMENT, CANTERBURY.

MR. NUNN's report on South African Horse-sickness induces me to offer a few remarks, which may not perhaps be without interest.

In the year 1882, after the conclusion of the operations in Egypt, and which resulted in our occupation of that country, many of our army horses, and especially those of the 19th Hussars, suffered from a particularly fatal disease, which I considered a form of Anthrax. The symptoms, *post-mortem* appearances, and large mortality, especially among those early attacked, all pointed strongly to such a conclusion. Moreover, some blood, mixed with aqueous humour, was sent to England for examination, and

in it were found Anthrax bacilli, although the animals inoculated with it died of septicaemia, owing to the changes which had taken place in the inoculating material during transit to England. Consequently this means of proof failed.

The mortality among the hussar horses was large—about eighty having died out of more than two hundred cases—I cannot give the precise numbers, as I write from memory. Nevertheless, among many which recovered from attacks of this disease, I do not remember a single instance of a second attack having occurred during the time I subsequently remained with the regiment alluded to, which was more than two years.

In 1884 a number of horses were drafted from the 19th Hussars to regiments in South Africa, and amongst those drafted must have been many that had had what I consider the Egyptian form of Anthrax, as no English remounts had been received by the regiment after its departure from England. Consequently I was much surprised to learn a short time ago that the horses drafted from the 19th Hussars to South Africa had since suffered considerably from Horse-sickness. As I had been under the impression that Horse-sickness was a form of Anthrax, I was greatly perplexed to account for such a state of things. It is generally accepted that one attack of the latter disease confers immunity from subsequent attacks; and that being so, either the Egyptian disease was not Anthrax, Horse-sickness is not Anthrax, the Anthrax of one country gives no protection against that of another country, or Anthrax gives no protection against Horse-sickness. I cannot believe that the Egyptian disease was not Anthrax, for the reasons above given. That Horse-sickness is not Anthrax, Mr. Nunn has fairly shown, though not conclusively demonstrated. We have no sufficient proof that the Anthrax of one country does not protect against that of another; and if my conclusion as to the nature of the sickness in Egypt is correct, then Anthrax gives no protection against Horse-sickness. It is of course quite possible that the horses mentioned may not have had the disease in Egypt (I mean those subsequently attacked with horse-sickness), but this I think hardly probable, as, although I have mentioned the number of cases as somewhat over two hundred, it was in reality much more, as scarcely a horse escaped an attack though many attacks were extremely mild.

I believe it has not yet been discovered for how long an attack of Anthrax or protective inoculation gives immunity from subsequent attacks; and as five years have elapsed since the 1882 outbreak, it is probable that very few of the drafted horses now remain in the service; and possibly the protection which they may have then derived has by this time worn itself out.

Editorial.

THE FIFTH INTERNATIONAL VETERINARY CONGRESS.

At the fourth International Veterinary Congress held at Brussels in September, 1883, it was decided that the fifth Congress should meet at Paris. Acting on this decision, the veterinary profession in France is bestirring itself actively, and betimes, in order to prepare all the details necessary to ensure a brilliant success to the gathering in the French Capital. A committee has been formed, chiefly of Parisian veterinary surgeons and professors, with Dr. Chauveau as Vice-President; and it has been settled that the Congress will meet in September, 1889, the month being that in which teachers usually have their holiday, while the year will be auspicious as that in which the Universal Exhibition is to be held in Paris. On this occasion, the monument to the deceased Professor Bouley will be inaugurated at the Alfort School, and nothing, we may be certain, will be left undone to render the Congress one of the most useful and memorable of those yet held.

The Committee have issued a circular addressed to French and foreign Veterinarians, in which an appeal is made to them to aid in carrying out those measures which will guarantee success. In the circular sent to our French confreres, it is pointed out that France has been the cradle of veterinary science, and that from the French veterinary schools have been formed all those foreign schools in which scientific and practical veterinary knowledge has been disseminated. French veterinary surgeons are bound in honour to show that in this branch of human knowledge, as in all others, France has not fallen behind. The Brussels Congress was a brilliant success. That of Paris should not be inferior; therefore everyone is appealed to, without distinction of origin or situation—professors, functionaries or practitioners, civil or military—to unite, and show to the strangers a professional body advancing resolutely in search of the scientific solution of the great international questions which are in the domain of veterinary science. A hope is expressed in the circular that the French Government will grant a subvention to a Congress assembled to discuss momentous questions pertaining to international sanitary police.

Each member of the Congress will be asked to pay a sum of ten francs towards defraying the necessary expenses, but notice when the payment is to be made will be given hereafter. Each member will receive copies of all the publications issued by the Congress, post free. Those who wish to attend are requested to signify the same to M. Capon, 35, Rue de Babylone, Paris.

It is to be hoped that many members of the profession in this country will avail themselves of the invitation of their French brethren, and make the proposed Congress an unexampled success. Paris, at all times so attractive, will be unusually so in the autumn of next year, because of the Universal Exhibition, which promises to be of great dimensions and interest. The subjects to be discussed at the Congress are not yet published, but we shall keep our readers informed of the progress made in the arrangements. In the meantime, we would advise all those who purpose attending to send their names for registration to M. Capon, so as to afford the committee some idea of the numbers they will have to provide for, as well as to encourage them in getting through the heavy task they have to encounter before the Congress meets.

THE INFECTIOUS NATURE OF TETANUS.

In an editorial in the JOURNAL for last month, we referred to the somewhat novel views which are now being expressed with regard to the communicability of Tetanus, and gave instances which seemed to prove this hitherto unrecognised feature of the disease. In the *Lyon Medical*, Dr. Audry has a paper on the subject, which gives more details and evidence than were available when we penned our article, and which additional information may prove of interest to our readers.

In his paper Dr. Audry does not venture to give a history of the theories as to the pathogenesis of Tetanus, as this had already been done in many treatises, and especially the great dictionaries of Dechambre and Jaccomed, and Mathieu and Poncet; but confines himself to a *resumé* of the notions and new facts promulgated during the present scientific era, and related to the conception of Tetanus as an infectious microbic malady. Ozenne (*Archiv de Méd.*, 1884), Raymond (*Gazette Medicale*, 1886), and others had already traced this course, and Audry avails himself of their labours.

The idea as to the infectiousness of Tetanus arises from two orders of facts relating (1) To clinical observation on mankind and animals; (2) To bacteriological technique.

1. Benjamin Travers appears to have been the first to clearly formulate an affirmation as to the infectious nature of Tetanus, though, long before, facts were observed which might have led to such a presumption. Ambrose Paré believed that the improper dressing of wounds was one of the causes of its appearance. Bájon had remarked that the cases of Trismus of new-born children, so frequent in Guyane (France), were considerably diminished when the wound, due to the sloughing of the umbilical cord, was kept clean.

During the Seven Years' War there were several of those terrible and vast epidemics of the disease, one of which, in a single night, attacked no fewer than 4,000 of those wounded at the Battle of Prague. Larrey also witnessed them in Egypt and elsewhere—especially after the Battle of Bautzen in Saxony. Since then they have been noted in the Crimea and at Metz.

Nevertheless, Lister has never seen Tetanus develop in those upon whom he has operated since he adopted his antiseptic treatment; and Cooner in England, Bilbroth in Vienna, and Socin in Switzerland, willingly admit, with Lister, the probable microbian nature of the malady. Facts multiply in this direction. In Denmark, the cases of Trismus which ravaged a maternity hospital disappeared with the introduction of antisepsis. In the service of M. Magnien, at the St. Etienne Hospital, the number of cases of Tetanus

were diminished eighty per cent. by the same influence. At the same time attention was fixed on a crowd of facts which assumed a new significance. M. M. Saint-Germain and Polaillon witnessed, in their practice, a series of cases which occurred unexpectedly, and without any external and appreciable signs, at St. Etienne, all the amputations—four in number—performed in the practice of M. Riemboult during four years were followed by Tetanus, and M. Verneuil did not hesitate in attributing their origin to the employment of non-disinfected intruments.

M. Larger describes the epidemic at Carrière-sous-Poissy, and cites the fact of two wounded labourers, lodged in the same place, becoming affected with Tetanus at an interval of eleven years from each other.

At the Surgical Congress, M. Thiriar, of Brussels, referred to an epidemic in which eight cases occurred around Nivelles, not including four appearing after the operation of ovariotomy. H. Blanc, of Bombay, adopted the view that Tetanus was transmissible, and thought water was the vehicle of the poison.

Some weeks subsequently, M. Larger related the history of three cases occurring simultaneously at the Colmar Hospital.

Finally, Verneuil and Larger, calling to their aid the information the veterinary art could furnish them, concluded that animal Tetanus was contagious, and indicated the possibility of its transmission to man.

M. Cagnat, having castrated, consecutively, six horses with the same écraseur, found that all of them died of Tetanus; the instrument having been cleansed, there were no more deaths. M. Langevin, stated that, in 1848, Veterinary Surgeon Huvelier lost from Tetanus thirteen of fifteen horses which he had operated upon simultaneously; and M. Bounian mentioned that of six bulls which he had castrated at the same time, five had Tetanus. M. Thierry castrated fourteen lambs, and twelve succumbed, while thirteen operated upon at the same time by another veterinary surgeon recovered. On inquiry it was found that five months before, a horse died of Tetanus ten or twelve yards from the place where Thierry's newly-castrated lambs were lodged.

In 1870 M. Anger saw a dog become tetanic where there was a horse suffering from the disease.

In 1885 Larger gives the case of a woman dying of Tetanus, who lived near a stable in which there was a horse affected with the disease. MM. Kermisson, Bouilly, and Hirtz observed the complication in people who were wounded by horses (wounds on the head, bites, etc.); and Verneuil even makes himself the apostle of the theory as to the equine origin of human Tetanus.

On the other hand, however, M. Saucerotte, of Luneville, draws attention to the rarity of Tetanus among the cavalry at that place; and M. Terrier thought that the facts were not yet sufficiently numerous or probable, that they could be looked upon as absolutely affirmative; M. Larger himself replying that, in his opinion, the transmissibility of equine Tetanus to man was as yet only probable.

While the French clinicians were collecting facts, the experimentalists were not inactive. In 1868, Rose failed to produce Tetanus by inoculation; Arloing and Tripier also were unsuccessful, though they employed blood and pus; while Nocard, Antonelli, and Cocco were no more fortunate.

In 1883 the problem was advanced an important step, MM. Carl and Rattone having succeeded for the first time in producing the disease by inoculation. A man died from the malady, which was due to an acne pustule on his neck. Carl and Rattone excised the tissues of the pustule, and, examining them in an emulsion, saw cocci and bacilli in them—a discovery which had only a minimum value; but intra-sciatic, intra-muscular, and

intra-vertebral inoculation with their dilution produced Trismus and Opisthotonos in eleven of twelve rabbits experimented upon. Bizzozero and Berruti obtained analogous results, but failed when employing blood. In 1884 Nicolaïer, one of Flügge's pupils, discovered in vegetable soil a microbe which, when injected into the guinea-pig, produced a tetaniform affection transmissible by inoculation; the muscular spasms commencing in the inoculated limb, soon became generalised. This microbe was a long bacillus, particularly abundant in the pus formed at the seat of inoculation. But Nicolaïer failed in his attempts to isolate it in pure cultures, although his series continue to be toxical.

Lastly, Rosenbach, employing fluids obtained from a person affected with Tetanus, consecutive upon frost-bite of his feet, succeeded in isolating a bacillus which he could grow in a pure state, and in indefinite series, while retaining its power of producing Tetanus in animals inoculated with it.

It would appear that in Germany it is generally admitted that Rosenbach's bacillus is really the microbe of Tetanus. It is from its cultivations that Brieger has obtained the materials necessary for his researches, which will be referred to presently.

Of course, it was not to be expected that identical results would be obtained everywhere else. Doyen, in France, found cocci in similar investigations. In Italy, Ferrari got some blood from a patient suffering from Tetanus following ovariotomy. Cultivations made in agar and on gelatine yielded colonies of cocci, the intra-medullary and subcutaneous injection of which induced Tetanus in rabbits.

On his side, Bonome saw, in a patient suffering from fracture of the spine, Tetanus arise from bed-sores. He took from the neighbourhood of these sores some pus, and, inoculating rabbits with it, in a few hours these were tetanic. Cultivations made with the fluids infiltrated at the points of inoculation yielded cocci and bacilli which he could not isolate.

As will be noted, unanimity does not prevail on the question. Ferrari believes the microbe to be a staphylococcus, Rosenbach a bacillus. But the great experience of the last-named investigator, and the curious experiments of Brieger, tends to the belief that truth is on the side of the German.

Brieger worked with broth inoculated with the bacilli of Rosenbach, and succeeded in isolating the four "toxin" or ptomaines as follows:—

1. Tetanin, easily decompocable by acids, but inattackable by alkalies. Injected in doses of a few milligrammes, it causes death, with tetaniform manifestations.

2. Tetanoxin, producing tremblings, paralysis, and cramps.

3. An unnamed substance which produces Tetanus and causes great increase in the lachrymal and salivary secretions.

4. Spasmotoxin, which kills animals with tonic and clonic convulsions.

In decomposed cultures these substances are not found.

Here are, then, if we are to believe the Berlin chemist, four new isolated bodies, veritable ptomaines, resulting from the vegetating of the bacilli of Tetanus, and reproducing the symptoms of that malady.

If these results are incontestable—and they can only be so by people of altogether special competence—it is certain that a great advance has been made in microbio-chemistry. Nevertheless, it is not permissible to accept as quite demonstrated at present the absolute value of Rosenbach's bacillus. The extreme difficulty with which it can be cultivated—a difficulty so great that bacteriologists of the greatest competency have failed in their attempts, and no one has been able to categorically control Rosenbach's results—may cause us to hesitate in affirming the question, although it may be possible to admit as very probable the infectious and transmissible nature of Tetanus.

NOTES ON ANTISEPTIC SURGERY IN THE AUSTRIAN AND GERMAN VETERINARY SCHOOLS.*

BY DR. HUTYRA, PROFESSOR OF ANATOMY AND PATHOLOGY, VETERINARY SCHOOL, BUDA-PESTH.

For some time past at the veterinary school at Vienna and other schools in Germany, antiseptic surgery has been practised and carried out as nearly as possible on the same lines that have given such good results with human beings.

In the large animals that are our patients, complete Listerism cannot be carried out, the spray and the various complicated dressings employed by the celebrated Edinburgh professor, not being practical in veterinary surgery. Nevertheless, it is not absolutely necessary to carry out to the letter the various complicated methods advocated by Lister, to obtain good results, and great advantage can be obtained by much simpler procedure, in which the essential principles of Lister's methods have not been lost sight of. Antiseptic dressings are not only used in the veterinary schools, and by practitioners in large towns, but by many in remote country places, and owing to the extremely low cost, there is every probability of their use becoming more general, and simple antiseptic dressings that can be applied by any one are generally sufficient to bring about healthy healing action with little or no suppuration in cases of severe injury, which, without these precautions, would heal but slowly, and even then in an unsatisfactory manner. Bacteriological research has been the chief factor in modern modifications of Listerism, certain drugs and substances which were formerly supposed to be endowed with antiseptic properties, having been proved to have in reality but a very slight action on micro-organisms. According to Koch, corrosive sublimate, permanganate of potash, chlorine water, and solution of iodine, are the most active of the parasiticides. Carbolic acid in a concentrated aqueous solution of 3 to 5 per cent. is a good antiseptic; but in oil or alcohol it loses part of its activity. Gartner and Plagge have made a number of researches into the antiseptic properties of a number of drugs which, from a surgical point of view, are of the highest value. Cultures of various bacteria were brought in contact for from fifty-eight to sixty seconds, with various antiseptic solutions, and their vitality proved by making inoculations on to gelatine or gelatine and peptone. These authors have found that corrosive sublimate 1 to 1,000, and carbolic acid 3 per 100 in an aqueous solution, killed these bacteria in 8 seconds. A 2 per 100 solution of carbolic acid did not kill most of them until after 30 to 45 seconds, and with a 1 per 100 solution results were very incomplete and uncertain.

The conclusions that Gartner and Plagge drew from their experiments are that a 3 per cent. solution of carbolic acid, or a $\frac{1}{10}$ per cent. solution of corrosive sublimate, is for all practical purposes sufficient to disinfect the hands of the operator, instruments, wounds, and the region about to be operated upon, and that in about twenty seconds they will destroy septic or putrefactive micro-organisms.

Heyn and Rovsing, of Copenhagen, have made a series of researches into the toxic effect of iodoform on the micro-organisms commonly found in wounds, and they have found that certain of them, more especially the "Staphylococcus pyogenus aurens," will retain their vitality for a month in iodoform powder.

Bassowski, in fifty cases, in which he examined the material collected from iodoform dressings, only found ten free from micro-organisms. In twenty-six he found the Staphylococcus pyogenus albus; nine, the Staphylococcus

* Translated by J. A. Nunn, Army Veterinary Department, F.R.C.V.S., F.R.G.S., Cape Colony.

pyogenus aurens; two, the Staphylococcus pyogenus; and in three other cases other organisms. Volkmann, of Halle, confirms these observations. Bassowski furthermore states the curious fact, that the Staphylococcus pyogenus albus is no hindrance to the healing of wounds by first intention. These experiments, however, do not disprove the great antiseptic value of iodoform, which, by setting free iodine, destroys micro-organisms, although, perhaps, not so rapidly as other drugs, and which in animals, as in man, has the great advantages of drying up wounds and allaying pain.

Corrosive sublimate is usually employed in a solution of 1 per cent., the following formula being recommended by Vogel, of Stuttgart: 1 gramme each of corrosive sublimate and common salt to a litre of water, the salt being used to cause perfect solution of the corrosive sublimate; and he has obtained good results in affections of the uterus of a septic or putrid nature with a $\frac{1}{10}$ per cent. solution.

In cases of operations on the hoof, Dr. Hutyra puts the foot the day before into a bath of corrosive sublimate solution, and during the night keeps it well covered up with bandages thoroughly saturated with it. The animal is thrown on a bed of fresh straw covered with a clean cloth, or some impermeable material. At Berlin and Munich a large leather cushion is used, that is thoroughly cleaned and disinfected after every operation. That used at Berlin is about 20 centimetres thick, and by a system of pulleys can be raised and lowered at pleasure.

At Munich the floor of the operating room is a rectangle of asphalte, 3 metres long by 2 wide, dipping down in the centre, where there is a hole connected with a discharge pipe to carry blood and other fluids; the rest of the floor is covered with cork. One corner of the asphalted rectangle is furnished with a pipe and a tap, from which a powerful jet of water can be obtained at any time during the operation. The patient is cast on the cork floor, where minor operations are performed; but if there is any great amount of hæmorrhage he is removed to the asphalte.

Professor Frohner, of the Berlin Veterinary School, operates on small animals on a table with a double top, the upper one of perforated zinc, which allows blood and fluids to run through it on to the lower one, where they are collected in a receiver.

At Munich, for dogs a table is used furnished with a square bag, in which the dog is placed, and the anæsthetic is administered. The table is then carried into the operating theatre, the cover removed, and the operation performed. When the patient is properly secured, the hair on the region of the body where the operation is to be performed is cut, the skin washed with soap and water and a brush, and the antiseptic, "either corrosive sublimate $\frac{1}{10}$, or carbolic acid 3 per cent." applied freely, and in the case of the foot the hoof is carefully dried. Everything likely to come into contact with the wound is carefully disinfected, such as the hands of the operator, instruments, etc., with one or other of these antiseptic solutions, the instruments being kept in it during the whole operation. Professor Bayer, of Vienna, uses a small table on short legs, that has three square metal divisions on it of different depths, in which instruments can be placed in different antiseptic solutions. Sponges are used for cleaning wounds during the operation. The sand is removed from them by beating; they are then washed in warm water until it remains quite clean and uncoloured; they are then put into a 5 per cent. solution of carbolic acid, which is changed every second day for eight days; then boiled for a quarter of an hour in a solution of bicarbonate of soda, and then kept in a 5 per cent. solution of carbolic acid until required for use. Bayer recommends an 8 per cent. solution of chloride of zinc if there is any dead tissue in the wound. If sutures are necessary, catgut is preferred, disinfected in the same manner as sponges, and they are kept till

required in a 5 per cent. solution of carbolic acid and olive oil. If the wound is superficial he powders it over with iodoform.

In operations on the foot, Dr. Hutyra at once dresses it with a thick pad of sterilized tow and any of the above-mentioned disinfectants. He takes the temperature carefully, and if surgical fever does not manifest itself, he does not disturb the dressing, leaving it on if necessary for several weeks; he strongly insists, however, on renewing it if the temperature rises one degree Centigrade. This system is carrying into practice the well-known method that is now in vogue with all workers in bacteriology, of plugging culture tubes with sterilized cotton wool.

TREATMENT OF TRAUMATIC ERYSIPELAS BY RESORCIN.

Resorcin may be employed in Erysipelas under three different forms, viz.: as subcutaneous injections, lotions, and ointments. The last mode, experimented on by Andeer, Cattani, Moncorvo, Unna, and many others, is preferable to the solutions. These produce an astringent effect on the tissues. As to the subcutaneous inoculations, they give uncertain results; and if one employs concentrated solutions, disagreeable cicatrices are the result. In a case under notice, a mare, seven years old, presented marked Erysipelas of the back of the near hind limb, the result of a kick. The skin was inflamed and tender to the touch. In many points excoriations were present, some of which were covered by crusts, others were humid and suppurating. The animal avoided bringing the foot to the ground. The excoriated parts were washed, and resorcin ointment was applied to them (resorcin sublimate and hog's-lard, of each equal parts). Next day there was a noticeable amelioration. The applications were renewed, and on the fourth day there was noticed a sensible amelioration. The crusts had detached themselves from excoriated points. On the fifth and seventh days, friction was applied and a bandage put on. A complete cure was effected in thirty-five days. Two following observations are analogous to the first (*Recueil de Med. Veterinaire*, 15th January, 1887).

(*b*) Cocaine in the Removal of Vesical Calculi.

A gelding, seven years old, presented the following symptoms: Micturition difficult, with intermittent and violent tenesmus, Colic, urine charged with mucus and blood-coagulæ; the presence of a vesical calculus was suspected and confirmed by rectal examination. The principal point of interest in this case consists in the employment of cocaine with local anesthetics for avoiding the dangers of the operation of incision of the urethra. A solution of cocaine, 4 to 100 parts, was injected under the skin to the level of the ischial arch, and the patient was left in a standing position. The incision was practicable without the animal manifesting any pain. These calculi are extracted without any difficulty by the aid of the forceps in small animals. (*Recueil*, September 15th, 1886.)

(*c*) Valdivine

is the active principle of Simalba valdivia of Colombo. It is very soluble in water (1 to 600), soluble in alcohol (1 to 70), less soluble in absolute alcohol (1 to 90). M. Nocard has experimented with the toxic action, physiological and therapeutic, of valdivine: he finds its narcotic and toxic properties most pronounced in doses of 2-4 milligrammes. In the dog it has been found rapidly to reduce the temperature, and is also useful in allaying tumultuous action of the heart. M. Nocard has tried subcutaneous injections of this agent in Rabies in the dog. (*Recueil*, September 30th, 1886.)

SOME OF THE INFECTIOUS DISEASES COMMON TO MAN AND THE LOWER ANIMALS.

BY E. KLEIN, M.D., F.R.S.

THE following is a brief abstract of the more interesting portions of a paper read at the Epidemiological Society of London, on December 14th:—

Jenner's views as to the relation of human Variola and Cow-pox are so well-known that it is unnecessary for me to enter into them, and likewise Ceely's classical paper in the "Transactions of the Provincial Medical and Surgical Society," and Dr. Badcock's results have more than once been discussed and commented upon. Ceely, by direct inoculation of human Variola into heifers, has succeeded in two instances in producing vesicles identical with those of the natural Cow-pox, and in transmitting the lymph from them into generations of human beings as Vaccinia; he has thus proved that Vaccinia is a modified human Variola, having obtained this modification by its passage through the cow. Now, it is known that the French Commission under Chauveau arrived at a different conclusion. They were unable to produce such a result as Ceely did by inoculating calves and heifers with human Variola; in some instances they assert to have produced a papular eruption at the seat of inoculation; the matter of such papules when inoculated into human beings produced, again, Variola. They concluded from these experiments that human Variola is transmissible to the bovine species as Variola, but does not produce Vaccinia. That this conclusion does not necessarily follow from the experiments of the French Commission has been very ably argued by the late Dr. Seaton and others. All that can be said of the work of the French Commission is that their attempts to produce Vaccinia by means of human Variola were negative. I can fully appreciate these negative results, because some years ago I have myself had opportunity, under the late Dr. Seaton, and under the late Mr. Ceely, to make such inoculations on a large scale. Over thirty milch cows and heifers had been inoculated with lymph of human Variola; fluid condition and dried on points, taken from cases of confluent Small-pox in different stages; clear lymph, purelent lymph, and crusts. Every animal was inoculated in from six to twelve places, each place being made up of a number of simple or crossed incisions about half an inch or more, and a large quantity of lymph was rubbed into each place of inoculation. Many of the animals were thus repeatedly inoculated. But in no instance was there produced a vesicle, or anything comparable to a Cow-pock. We concluded from these experiments that to obtain a positive result an unknown additional condition is required, which was absent in our experiments. I am afraid that as long as the present uncertainty as to the exact nature of the virus of Vaccinia and Variola remains, no clear experimental proof will be obtainable, unless it be that a different method of experimentation with Variola lymph is employed than has hitherto been followed. As regards the first—*i.e.*, the nature of the virus—various assertions have been made from time to time, without, however, bringing us much nearer to the exact understanding. F. Cohn has, many years ago, ascertained the presence of micrococcus of the character of streptococcus in the lymph of Variola and Vaccinia; Sanderson confirmed this; Weigert found micrococci in the lymph of the vesicles and lymphatics of the Variola eruption; Pohl Pineas described them also in the tissue of the epidermis of Vaccinia. Dr. Paul Guttmann isolated, by cultivation after the modern methods, three different varieties of micrococci from the lymph of Vaccinia and Variola; so did also Dr. Buist. I show you here a streptococcus which is constantly present in human Vaccinia, which corresponds to one of the streptococci isolated by Guttmann, and which he regards as the Vaccinia streptococcus. Quite recently it has been, however, maintained that none

of the species of micrococci hitherto isolated by the gelatine method can be the virus of Vaccinia, but that it probably is some other organism not capable of growing in gelatine. The fact of the matter is, no one has yet succeeded in making a successful inoculation experiment with any of the organisms isolated from either Variola or Vaccinia. In saying this I am quite aware of the assertions of Dr. Buist, who claims to have succeeded in this; but reading his statements, and comparing them with his experiments, I think you will agree with me that they do not carry a great amount of conviction.

[The subjects of *Hydrophobia* and *Diphtheria* were discussed by Dr. Klein, who then proceeded to the consideration of *Scarlet Fever*. He said that it would, no doubt, be in the recollection of the Society that at the end of 1885 and the beginning of 1886 an extensive outbreak of Scarlet Fever occurred in Marylebone, which Mr. Wynter Blyth has traced to be due to consumption of milk coming from a particular farm at Hendon. Mr. Power supplemented this by finding that cases of Scarlet Fever occurring also in other districts of the metropolis were likewise to be referred to the milk of the same farm. With Dr. Cameron, medical officer of health of the Hendon district, Mr. Power was able to exclude all and every accidental contamination of the milk of this farm from human source. Mr. Power had further shown "that only certain sections of the milk supplies within the farm, and eventually certain cows, as having to do with the infectivity of the milk."] The report of Mr. Power is known to you, and I think you will agree with me that in reading it, and following from step to step the clear and precise observations of Mr. Power, we cannot refuse admitting the correctness of his conclusions. It is not my object or my place to defend Mr. Power's conclusions—he is quite capable of doing so himself; but I will undertake to say this, that to an unbiased raader the methods by which he arrived at those conclusions are unimpeachable, and the proof amounts almost to a mathematical demonstration....A point that our opponents have brought forward refers to a disease in the cow which, it is alleged, is the same, and has the same origin, as the Hendon disease, but has not produced infection of human beings with Scarlatina. Now, let me first remind you what the conditions of the Hendon disease were. I will quote the concise summary given by the medical officer of the Local Government Board, in his report of 1885-1886, pp. vi. and vii.: "In the end," says the medical officer, "he (Mr. Power) has demonstrated beyond reasonable doubt the dependence of the milk-Scarlatina of December on a diseased condition of certain milch cows at the farm; a condition first introduced there in the previous month by some animals newly arrived from Derbyshire; and he finds strong circumstantial evidence for believing that the later phenomena of this dependence were brought about through the extension of the diseased condition of one set of animals to another set, after the fashion of an infection." This disease in the Hendon cows manifested itself in the following symptoms:* ulcerations covered with scabs on the teats and udder, ulceration, scabs, scurfiness, and loss of hair in patches in different parts of the skin; the animals were thin, and exhibited slight cough, but showed no rise of temperature. The viscera of two animals killed, showed: slight pleuritis, with recent fibrinous deposits and adhesions; congestion and extravasations of blood in many lobules of the lungs; discoloured softened patches in the liver tissue; ecchymoses and petechiæ in the tissue and in the capsule of the spleen; swelling of, and extravasations of blood in, the lymphatic glands; congestion and glomerulo-nephritis of the cortex of the kidney; in some, also, interstitial new growth.

* The description given by Dr. Cameron of the Hendon disease is admittedly and, to a large extent, based on various statements by different persons, who in previous years, and at different localities, maintain to have observed a disease in cows similar to the Hendon disease.

With the material of the ulcers the disease was reproduced in the skin of calves; from the tissue of the ulcers of the Hendon cow an organism was isolated by cultivation, of which the characters in the depth and on the surface of gelatine, on agar-agar mixture, in broth, milk, and on blood-serum, were minutely studied, and hereby its identification became possible. This streptococcus, when inoculated into calves, produced a visceral and sometimes cutaneous disease, mild in character, and which very much resembled that of the Hendon cows. With this organism, by feeling or inoculation, a disease ending fatally in a large percentage was produced in gray house-mice; from the heart's blood of these the same micrococcus was recovered by cultivation. Professor Axe has presented a report to the Agricultural Department of the Privy Council Office, in which he states that in two different localities cows had been affected with ulceration of the teats and udders, and that the disease had been introduced at the same time into these localities by infected cows coming from the same dealer in Derbyshire that had supplied those incriminated first cows to the Hendon farm, but in those two localities no Scarlet Fever had been produced amongst the consumers of the milk. Now, let me here say that this dealer in cows in Derbyshire had at first stoutly refused any and every information to Mr. Power; but some months afterwards, when this investigation at the Hendon farm had to a great extent implicated the stock of this Derbyshire dealer, he had altered his mind, and offered all the above information. It would seem, in such a case, that some corroboration of the statements and observations of the Derbyshire cow-dealer should have been forthcoming. I do not question for a moment that Professor Axe had correctly reported what he heard and saw as to the ulceration of the teats and udders in the two herds, and that he had been told and had observed that the disease spread in each herd, and that it was introduced there by cows coming from the dealer in Derbyshire above mentioned; but what I should like to be permitted to question is the reliance that ought to be placed on the information offered by the above Derbyshire dealer—*i.e.*, whether about the same time and from the same stock that he supplied cows to the Hendon farm he also supplied those two other localities. That the disease observed in these two localities is the same as that at the Hendon farm there is no evidence whatever; sores and ulcers on the teats and udders of cows of an infectious character are known in veterinary pathology, and they are known to be of various kinds. In connection with this I will mention one striking coincidence that refers to this Derbyshire dealer. It will be, no doubt, in your recollection that an extensive outbreak of Scarlet Fever occurred at and about Wimbledon at the end of the last and the beginning of this year. This epidemic was traced distinctly to milk coming from a particular farm. Now, the curious thing about this farm is that it belongs to a dairy farmer of the name of Keevil, who happens to be the brother of our Derbyshire dealer, and who had received some of his cows from this same dealer shortly before the outbreak of Scarlet Fever in Wimbledon. The way this Wimbledon milk had received the contagium has not been ascertained by Mr. Power, but the fact that the Wimbledon dairy farmer, Keevil, had got cows from the Derbyshire dealer, Keevil, who had supplied the Hendon farm, is, I think, extremely suggestive. Owing to the kindness of Professor Brown, I have been enabled quite recently to observe a cow which belonged to a herd in which a contagious ulcerative disease of the teats and udders prevailed, which was supposed to be the same as that of the Hendon cows. No cases of Scarlet Fever have been known in connection with these cows. The ulcers on the teats were very extensive, superficial, irregular, and covered with brown crusts, the teats themselves much swollen. Taking off the crusts and scraping the superficial part of the ulcers, and then taking material from the deeper part of the ulcer and inocu-

lating gelatine, I succeeded in isolating four different species of micrococci—(*a*) micrococcus citreus; (*b*) micrococcus aurantiacus; (*c*) staphylococcus pyogenes; (*d*) a micrococcus, which in plate cultivation, on the surface and in the depth of gelatine, presented characters resembling the micrococcus Scarlatinæ, obtained from the Hendon cows and from human Scarlet Fever. But it soon became apparent that it is an altogether different species; it grew much more slowly, and its colonies (minute circular dots) are much more transparent than those of the Hendon cow organism; further, while the micrococcus of the Hendon cow and of human Scarlet Fever grows well in broth, producing after two days at 35° C. a distinct turbidity, and also well on the surface of agar-agar mixture, as isolated whitish dots; the micrococcus in question isolated from the ulcer of Professor Brown's cow does not show any growth on agar-agar mixture, or in broth, even after a five days' sojourn in the incubator at 35° C. The animal in question was killed after about a fortnight, when the ulceration and swelling of the teats were still considerable. The left hind-quarter of the udder was found very tense, and greatly swollen; on incision, a large quantity of thick, grumous pus was found in this portion. The lungs were normal, the spleen was normal, the liver exhibited a few whitish irregular spots, and the kidney presented a few fatty patches on the surface of the cortex; none of the lymphatic glands showed the hæmorrhage into their substance. During life the animal had, all the time while under observation, high temperature, varying between 105° and 104° F.; and no wonder, seeing the extensive suppuration that was going on in the udder. There can, then, be no question that this cow did not show the same disease that was observed in the Hendon cows, nor was the same organism obtained. Two others cows were kindly given me by Professor Brown, and also in these the same condition was present and the same result was obtained by culture and in the *post-mortem* examination.

The last point of opposition urged is that of the so-called bacillus Scarlatinæ of Edinburgh. Dr. Edington has isolated from the epidermis during the stage of desquamation of Scarlet Fever cases a bacillus which he considered to be the bacillus of Scarlatina. He maintained that this bacillus is present in all cases of Scarlet Fever in the blood before the third day; it then disappears from the blood in order to appear in the skin, whence it is discharged into the epidermis, and here forms spores during the stage of desquamation. In the first place, let me remind you that various species of bacilli and micrococci have been hitherto isolated from the epidermis of the normal skin. In the second place this bacillus of Edington has not been found in all early cases of Scarlet Fever by a committee of the Medico-Chirurgical Society of Edinburgh, appointed to test Dr. Edington's assertion, only in the blood taken from a prick in the finger of two out of ten cases of Scarlet Fever on or before the third day. Anyone acquainted with the modern methods of bacteriological inquiries will agree with me when I say that there is no difficulty whatever for anyone who devotes the necessary time to it to isolate by the modern exact methods new species of bacilli or bacteria in any material he chooses to select. . . . The point, therefore, in the present state of bacteriological researches is not whether in any morbid material of the body this or that new species is present, but whether in its distribution and its action it bears any definite relation to that morbid process. Now, everyone acquainted with these fundamental conditions will understand that one of the first and essential conditions would be that a microbe which is to bear any relation to Scarlet Fever must be found in the blood or tissues in a definite distribution. Examining the desquamating epidermis and finding a new species of bacteria may mean nothing more than this—viz., that to those several species already known to exist in the epidermis, another species has been added, which, in itself, is no doubt an

interesting discovery, as much as, for instance, is a new species of diatome or a new beetle in a locality where no one has seen it before. But this new addition to the list of bacilli in the epidermis may have nothing whatever to do with Scarlet Fever. This so-called bacillus of Scarlatina is a bacillus which belongs to a well-defined group of species which in former years would have been considered as bacillus subtilis—viz., rods of a certain length and thickness, mobile; they have a tendency to form long chains or leptothrix; they grow rapidly in broth, and form here on the surface a scum, which is already well developed after twenty-four hours; the scum thickens during the next days, and becomes corrugated, the fluid itself remaining clear, but gradually becomes brownish—the more brown the longer time elapses; they liquefy rapidly gelatine, and after some days form also here a scum on the surface; they form in a few days a corrugated scum on the surface of solid agar-agar mixture; they grow rapidly in milk which is curdled, and by which a white precipitate is formed, while the fluid, at first turbid, gradually becomes clear; on its surface there is a thick pellicle. In plate cultivations in gelatine, the bacilli form minute whitish colonies, at first—*i.e.*, during the first day angular, after thirty hours or more gradually liquefying the gelatine, and forming circular colonies of liquefied gelatine with an opaque or slightly granular outline, and a central, whitish spot due to precipitate of masses of bacilli. On potato they grow rapidly, and form a more or less corrugated layer, gradually turning brownish. Now I know of five different species; all notoriously septic bacilli, which show these characters besides the Edinburgh bacillus; they show, nevertheless, slight differences, and may be considered as different species, but as to those general characters just mentioned, there is no doubt they belong to the same group of organisms. To sum up, then, the Edinburgh bacillus, judging by its mode of growth, clearly belongs to a group of species of bacilli which are notoriously septic bacilla. It has been found in a small percentage of cases of Scarlet Fever in blood taken from a prick of the finger; its spores occur in the epidermis of cases of Scarlet Fever, amongst other species of bacteria; it has no action when the bacilli or spores are injected subcutaneously, and in a pure state, into animals. You will, I think, agree with me that after such evidence, it would be quite unjustifiable and premature to call this bacillus the bacillus of Scarlet Fever. This whole question of the etiology of Scarlet Fever is no doubt an extremely difficult one, and only by combined work on an extensive scale, and by careful and accurate methods, can we hope to get at the truth of the matter; and in these efforts no criticism should be shunned or objected to, but, on the other hand, it must be criticism made in an unprejudiced and scientific spirit.

AN INVESTIGATION INTO THE SO-CALLED HENDON COW DISEASE, AND ITS RELATION TO SCARLET FEVER IN MAN.*

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MR. PRESIDENT,—Though the investigation which I bring before you to-night is not yet complete in many details, I feel that, as the subject is of such great public importance, and information is awaited with keen anxiety in the agricultural world, it is right that an account of what has so far been done should at once be published, especially as the evidence which has already come to hand has forced me to come to definite conclusions. I would add I feel strongly in investigations which are so strictly pathological that the assembly to whom the results should first be made known is this Society. I

* Abstract of a Report to the Agricultural Department of the Privy Council, read efore a special meeting of the Pathological Society of London, December 15th, 1887.

desire, therefore, most cordially to express my indebtedness to Professor Brown, of the Agricultural Department of the Privy Council, for giving me permission to lay this matter before you, and to you, sir, for having enabled me to do so without any delay.

Origin of the Investigation.—I will ask you first of all, sir, to allow me to remind you of the circumstances which have led to a searching inquiry being instituted by the Agricultural Department of the Privy Council into a disease in cows and its relation to Scarlatina in man.

Scarlatina in Marylebone.—On December 18th, 1885, Mr. Wynter Blyth reported to the Local Government Board a sudden and extensive outbreak of Scarlatina which was associated with the distribution of milk by a particular retailer in South Marylebone. The retailer procured his milk from two farms, and there can be little doubt that the milk responsible for the outbreak was derived from a certain dairy farm in Hendon. Mr. Blyth and the medical officer of health for Hendon, Dr. Cameron, were unable to obtain any clue as to the source of infection, and Mr. Power was deputed by the Local Government Board to make an inquiry into the matter.

Mr. Power's Diagnosis.—Mr. Power, having come to the conclusion that the milk had not become infected from any human source, proceeded to investigate the condition of the cows. A careful examination was made with a view to detecting any disease among the cows, and it was discovered that there were several on the farm which were suffering from a disease characterised by the appearance of vesicles and ulcers on the teats and udders. At this stage Dr. Klein became associated with Mr. Power in the inquiry, and we are told that their belief in the existence of a constitutional disease among the cows on the farm capable of producing Scarlatina among human consumers of the cows' milk became unreserved. Dr. Klein took with him samples of milk, contents of vesicles, and discharges from ulcers, and afterwards two cows were purchased and conveyed to the Brown Institution. At this stage of the inquiry a cowman pointed out to Dr. Klein that he had seen the disease on a certain cow which was one of a batch that had been imported on November 15th from Derbyshire.

Dr. Cameron's Account.—In a paper read before the Epidemiological Society, Dr. Cameron gave a detailed description of this Cow Disease. He pointed out that it was a specific contagious and infectious disease, capable of being communicated to healthy cows by direct inoculation of the teats with virus conveyed by the milker from a diseased animal. Further, he pointed out that the disease was communicable to man.

The Disease in Man.—A trusty informant received the virus into a recent scratch on the forefinger while milking a diseased cow. General weakness, malaise, and loss of appetite resulted, and after about four or five days a vesicle or small blister appeared on the finger. This broke, and several others formed on the back of the hand. The whole hand and fingers became swollen and inflamed, the inflammation extending in broad lines as far as the elbow. The general disturbance lasted a fortnight.

Symptoms in the Cow.—Dr. Cameron regarded the disease in the cow as constitutional, and he pointed out the occurrence of Initiatory Fever, cough, sore-throat in severe cases, discharges from the nostrils and eyes, eruption on the skin round the eyes and on the hind-quarters, vesicles on the teats and udders, and visceral lesions.

Character of the Eruption.—The condition of the teats is described as follows:—The teats became enlarged, swollen to twice their natural size, and œdematous. On fingering them there was no feeling of induration. Vesicles or bullæ then appeared on the swollen teats and upon the udder between or near the teats. These varied in number from two to four on a teat, and in size from a pea to a horse-bean. The vesicle contained a clear fluid. The

vesicle, Dr. Cameron adds, was not preceded by a hardened papule, but was in the first instance a vesicle or bulla. The vesicles were rubbed and broken on milking, and left raw sores, sometimes red, in other cases pale in colour, with raised ulcerated edges. Sometimes a few accessory vesicles formed around the margin of these ulcerated sores. After the rupture of the vesicle a brown scab formed, which might remain attached for five or six weeks, or fall off in ten days or a fortnight, a smaller one forming afterwards. A thin, watery fluid exuded from under the scab and the sore ultimately healed. Many scabs varied in size from a shilling to a florin; they were about one-eighth of an inch thick in the centre, thinning off towards the edges. When picked off, the recently healed skin was of a pearly-blue colour, with slight tendency to bleed when the scabs were forcibly detached. According to Dr. Cameron there was no depression of the vesicle or pitting of the skin. The swelling of the teat gradually subsided.

Dr. Cameron's Diagnosis from Cow-pox.—Dr. Cameron thus sums up the diagnosis from Cow-pox: "No hard pimple preceding vesiculation, no subsequent formation of pustule, no central depression of the vesicle, no marginal induration, no areola, and no pitting." In connection with this, it should be observed that Dr. Cameron acknowledges that not all of his account had been the result of personal observation, and that of necessity some of the earlier symptoms had been learnt from other persons.

Dr. Klein's Account.—I will now follow with the account given by Dr. Klein. He states that on the teats and udders of two cows which he investigated there were several flat, irregular ulcers, varying in diameter from a quarter to three-quarters of an inch. Some ulcers were more or less circular, others extended in a longitudinal direction on the teat. The ulcers were covered with a brownish or reddish-brown scab. The margin of the ulcer was not raised, nor was there any perceptible redness of the skin around. A small vesicle would make its appearance on a greatly swollen teat, and in the course of a couple of days assume the character of the above ulcers. As a rule, the disease affected the teats; but in some there was also, on the lower part of the udder here and there, an ulcer. In such animals patches denuded of hair were noticed on various parts of the skin, the tail and back particularly. In these patches the epidermis was scaly, and the cutis more or less thickened. The animals looked thin, but not strikingly so. In feeding capacity, milking power, and body temperature there was nothing abnormal. Two of these animals, as I have already mentioned, were sent to the Brown Institution.

Post-mortem Appearances.—Both were killed, and at the necropsy there were found on one (No. 3) petechiæ under the pulmonary pleura, peripheral lobules congested, and adhesions between lower lobes of lung and costal pleura; in the liver, reddish streaks and patches; spleen and kidneys slightly congested; on the placenta, petechiæ. In the other (No. 4) there were numerous congested lobules in the lungs, and pleural adhesions; cortex of kidneys congested.

Inoculation Experiments.—To study the transmissibility of the disease, Dr. Klein inoculated four calves in the corium of the groin and the inside of the ear with scrapings from the ulcers after removal of the crusts. In calf No. 3 there was vesiculation at the margin of the spot inoculated, and in the centre commencing formation of a crust. On the seventh day each sore on the ear had enlarged to about half an inch in breadth, and was covered in its whole extent by a brownish crust. On the eighteenth day they had all healed up and become converted into flat scars.

The Micrococcus of Scarlatina.—To search for micro-organisms, Dr. Klein removed the crust from an ulcer on the teat, scraped off the most superficial layer, squeezed the ulcer, and made cover-glass preparations with the exuded

lymphs. Tubes of nutrient gelatine and nutrient agar-agar were also inoculated. Dr. Klein succeeded in isolating a micrococcus which, after three to six days at 20° C., formed at the line of inoculation small points or granules, whitish in colour and tolerably closely packed. In the depth of gelatine the channel of inoculation was visible as a whitish streak, made up of smaller and larger droplets. The gelatine was not liquefied. Cultivated in milk and incubated for two days at 35° C., the milk was turned solid. Microscopic examination of a culture showed that there was micrococci, diplococci, and shorter and longer chains. In both, after two or more weeks' incubation, very long chains were formed. The micrococci showed a peculiar mode of division. The chains showed branchings, and here and there in a chain, the presence of a larger element amongst the smaller ones.

Inoculation with Cultivations.—Dr. Klein inoculated two calves in the groin with the cultivated micro-organisms. One calf died in twenty-seven days. No ulcers resulted, as after inoculation with the scrapings of the sores; but at the necropsy there were found peritonitis, hæmorrhagic spots on the omentum, congested liver, kidneys, and lungs, petechiæ under the pleura, and pericarditis. In the second calf, on the nostrils and lips, and in the hard palate and gums, numerous irregularly outlined patches were seen. They were discoloured, brownish, with a very slightly raised margin, and a paler centre. This animal was killed, and at the necropsy there were congested lungs, kidneys, and hæmorrhagic patches on the spleen. Thus in neither of these cases was a real ulcer produced as the result of the inoculation of the cultivated organism, but the *post-mortem* appearances and anatomical features recalled to Dr. Klein the lesions of Scarlatina. In the kidneys, for example, there were congestion of the cortex, hæmorrhages and glomerulo-nephritis, and granular or opaque swelling of the epithelial cells and infiltration with round cells. From the blood of the heart the micrococcus which had been used in the inoculation was recovered. In view of the evidence, Dr. Klein concluded that the *streptococcus was identical with the virus of the Cow Disease*, and that it produced a disease very closely resembling that of Scarlatina. In a paper read before the Royal Society, Dr. Klein describes how the work was carried on during 1886-87. Dr. Klein found in the blood of human Scarlatina that a micrococcus was present in four out of eleven cases. The micrococcus proved to be identical in its microscopical appearances and in its characters on cultivation with the micrococcus found in the Hendon Cow Disease. And by inoculation with a cultivation of the Scarlatina micrococcus, he states that a cutaneous and vesical disease resulted, which was identical with that produced in the calves infected with the micrococcus from the Hendon cows.

Dr. Klein's Conclusion.—In conclusion, Dr. Klein says:—"It must be evident from these observations that the danger of Scarlatinal infection from the disease in the cow is real, and that towards the study and careful supervision of this Cow Disease all efforts ought to be directed *to check the spread of Scarlet Fever in man.*"

An Eruptive Disease is Reported.—Cases of an eruptive disease of the cow having been reported to the Agricultural Department of the Privy Council, I received instructions from Professor Brown to undertake a series of researches on the lines indicated by Dr. Klein. The first animal that came under my observation had been purchased and removed to the Royal Veterinary College. This cow I shall speak of as No. 1. She was fairly well nourished, ate well, and was normal in her milk supply. Her temperature was normal on admission, but subsequently rose from Mammitis occurring as a complication. There was no desquamation, nor were there in this case any patches destitute of hair.

Character of the Eruption.—But there was a characteristic disease of the

udder and teats. On the right teats there were numerous sores varying in size from a pea to a penny. The sores were covered with crusts varying in thickness and generally fissured. In some they were flat, in others conical. Some were with difficulty removed with forceps, others were readily detached. The crusts varied in colour from reddish-brown to a very dark brown or almost black. On detaching or scraping a crust, there was a granulating and somewhat indurated base. On the right anterior teat there were several ulcers, from which apparently the thick crusts had been detached, and new scabs were forming. On the left posterior teat there were unusually large dark-brown crusts, especially at the extremity of the teat.

Examination for Micro-organisms.—Having entirely removed the crusts from some of these ulcers, I squeezed the base, and from the discharge I made a number of inoculations in nutrient gelatine and nutrient agar-agar. I also collected the discharge in capillary tubes and sealed them immediately, and also made a number of cover-glass preparations.

Inoculation Experiments.—With the discharge and with scraping from the ulcers I inoculated four white mice, one guinea-pig, and two calves. Of the two calves, one was inoculated by scarification on both ears; the other was scarified on the left ear and inoculated on the left groin by making an incision through the corium and rubbing in a scraping from an ulcer. In each ear and in the groin there were positive results. In the large brown calf inoculated in the right ear in two places, one place went through the following changes. On the third day there was apparent vesiculation, and commencing formation of crust. From day to day the crust thickened, and on the eighth day the crust was at its height, and detached at the edges. By removing the scab an ulcer was exposed. There was slight inflammatory thickening. About the thirteenth day the ulcer had quite healed. This corresponds very closely with the results obtained by Dr. Klein. The temperature of the calf was only slightly raised.

Cultivation Experiments.—I will now describe the results of the cultivations. The inoculations had been made for the most part in tubes of nutrient gelatine and nutrient agar-agar solidified obliquely. To separate the different organisms that might be present, I employed either Koch's plate-cultivations or Esmarch's method, or I simply drew the platinum needle in a line on the surface of the nutrient medium. Agar-agar tubes, inoculated in this way, were placed in the incubator at 37° C., and gelatine tubes were kept at 20° C. In the course of two or three days, a growth commenced along the track of the needle, consisting mostly of china-white, yellow, orange, and little dot-like colonies. Examination of the latter with a magnifying glass showed a little darkened centre, corresponding exactly with the figure given by Dr. Klein. Cover-glass preparations revealed at once an organism identical in form with that described by Dr. Klein. From these colonies cultivations were established in a number of tubes of nutrient gelatine, and in two or three days, at 20° C., the cultivations gave the peculiar finely-dotted appearance which has been figured and described so minutely. These preparations were demonstrated to Professor Brown on November 23rd. This micrococcus grows also in broth and turns milk solid, so that it exactly corresponds with the description and figures given by Dr. Klein of the so-called *micrococcus Scarlatinæ*. As I had procured cultivations, the animal was ready to be killed, and Professor Brown was anxious that Dr. Klein should be present at the *post-mortem*. In deference to Dr. Klein's wishes, the cow was conveyed to the Brown Institution, on the condition that due notice was given to enable us to be present at the necropsy.

Another Outbreak.—On Nov. 24th I accompanied Professor Brown to see another cow affected with a similar disease belonging to a herd in another county. The affection in this case was not so severe, but it also showed the

same characteristic brown or reddish-brown crusts, which on removal exposed a granulating thickened base with exudation of a lymph-like discharge and slight hæmorrhage.

Natural Infection.—The cow was suckling a calf, and this calf had previously been suckled by another cow also affected with the same eruption of the udders and teats. The calf had developed flat angry-looking ulcers on the nose and hard palate, and an eruption in the hairy part of the nose near the muco-cutaneous line of union. Cow No. 1 having been sent to the Brown Institution, a second cow (No. 2) was purchased from the same herd as No. 1. This cow also had a calf with suspicious places on each nostril; on the right side an apparent abrasion, and on the left a distinct but thin, flat, brownish scab. It would appear, then, that these calves had inoculated themselves by sucking the sore teats.

Inspection of an Infected Herd.—On Saturday, Nov. 26th, I proceeded to the affected farm from which the diseased cows, Nos. 1 and 2, had been purchased. On my arrival I made inquiries as to the first occurrence of the outbreak. I gathered that it appeared about the end of September, but it was said that no fresh cows were imported at that time. The disease commenced at a farm which I shall call V. The cows were moved from farm to farm, so the disease spread through all the farms, W, X, Y, and Z. In all there were about 170 cows. By examining two milkers I obtained the following history.

They said that the teats swelled, were hot to the touch, and very tender. As a result the animals were milked with difficulty. The milkmen resorted to the standing position, as otherwise they and their milk-pails were upset. In some cases the pain on milking was so great that the animals became almost unmanageable and had to be tied by the legs. One man described the pain caused by milking the severe cases as "most barbarous." They stated that a little white bladder would rise up on the teat, which would become as large as a pea or much larger, and then was burst in the milking. As a result a sore formed and became covered with a scab. Matter formed under the scab, and as the scabs were broken in milking, matter and blood would come out on their fingers and get mixed with the milk. Sometimes the scabs would become rubbed off, in other cases they fell off, and finally in four or five weeks the sores would be healed.

The Disease in Man.—At these farms I found that the disease had been communicated to several of the milkers. They have been inoculated some weeks before my visit, so I had at this stage no opportunity of seeing the early changes. I had therefore to rely a great deal on their description. I will select a few cases.

Cowman R—— showed me a scar on his right hand. He said he was the first to catch the disease. It came as a hard, painful spot, which formed matter and then a big scab. He had continued milking ever since, but had no fresh "places."

Cowman F——, about a month ago, noticed spots which appeared on both hands. His fingers swelled and were painful. He said it came first like a pimple and felt hard. "Then it "weeped out water" in four or five days. There were red marks creeping up his arm. There was a sort of throbbing pain, and he could not sleep at night. When I saw him I found on the right hand a scar, but on the left hand there was an ulcer, about the size of a shilling, covered with a thick black crust. The crust was partially detached, and exposed a granulating ulcer, It was the exact counterpart of an ulcer on the cow's teat.

Cowboy H—— had both hands bad about a month ago, first the index finger of the left hand and then the right hand. He says that it came up like a hard pimple, and the finger became swollen and red. After a few days it "weeped out" water, and then matter came away. Both his arms were

swollen, but his left arm was the worst. About a fortnight afterwards he noticed "kernels" in his armpits, which were painful and kept him awake at night. His arms became worse, he could not raise them, and he had to give up milking. He also had a bad place on the lower lip. On examination I found that the auxillary glands were still enlarged and tender. He volunteered the statement that the places were just like the sore teats.

H——, the bailiff's son, had a sore on the upper lid of his right eye and left hand. In both places he had previously been scratched by a cat. The right had also been infected. It commenced, he said, a fortnight ago. His hands were swollen, red, and hot. He felt very poorly, and went to bed. Little spots like white blisters appeared on the back of his right hand; these broke and "rose up" in thick scabs. He was very ill for two or three days, but did not send for a doctor. He had painful lumps at the bend of the arm and in the armpit. He gave up milking, and had not taken to it since.

Absence of Scarlatina among Consumers of the Milk.—As I have said, there were about 160 animals on these farms, and all, or nearly all, had contracted the disease. The milk was drunk on the farms and in the village, but most of it, amounting to eight churns a day—that is, sixty-four barn gallons, or 1,088 pints—was sent twice a day to a large city. Not being distributed in a wealthy neighbourhood, we may roughly estimate the number of persons drinking the milk at about 1,500 or 2,000. I was informed that there were no cases of Scarlatina on the farms or in the village. In the town district in which the milk was distributed there was no epidemic. From these observations and researches, I think that we are justified in concluding that the disease I have described is identical with the Hendon Cow Disease. For—(*a*) In both cases we have an eruption confined almost entirely to the teats and presenting precisely the same appearance and with the same history. (*b*) In both the disease is communicated from animal to animal by the virus being conveyed by the hand of the milker. (*c*) In both the disease is communicable to man when the virus is received into abrasions or scratches on the skin, and produces, judging from the description, a similar disease. (*d*) In both the disease is communicable by experimental inoculation. (*e*) In both there are occasionally the same constitutional symptoms, slight rise of temperature, eruption on the skin, patches devoid of hair, running from the eyes, etc. (*f*) In both there are streptococci associated with the disease, which are identical in every respect in their microscopical appearances and in their character on cultivation. And therefore I am of opinion that we are justified in concluding that the Hendon Cow Disease was not Scarlatina in the cow, and that in the Hendon cases the source of infection was from some unascertained human source.

Nature of the Disease.—I now pass on to give you my opinion as to the nature of this disease. The appearance of the eruption, especially in the bailiff's son, aroused a suspicion in my mind, and on returning from my visit to the farm I very earnestly questioned some leading veterinary surgeons as to the nature of this disease in the cow. I was assured that it was very common and very well known, though not described in the text-books of veterinary medicine. It was referred by them to various causes. In deference to their opinion I even suggested that if it were an undescribed disease it might appropriately be termed a contagious mammillitis. But my suspicions clung to me, and were strengthened by studying descriptions of affections of the teats in the cattle, and I expressed to several my disappointment at not having had an opportunity of seeing the earlier stages of the disease in man. I therefore determined to visit the affected farm again and again with the hope of seeing some fresh cases. On December 2nd I was rewarded for my trouble, for in course of conversation with a head cowman my attention was drawn to a lad who was standing at some little distance. I was told that his was a new case, and an examination of his face revealed to me in a

moment that my suspicions were well founded, for I was convinced *this disease of the teats of the cattle was the true Jennerian Cow-pox.* My first impulse was to carry the boy straight off to London, but the question of accommodation led me to have advice first as to what course I should pursue. I therefore made a drawing of the boy's face, filled a number of tubes with lymph, and spent the rest of the day in visiting a farm I had not previously seen. Here I found a very intelligent head cowman whom I had not interviewed before, and I determined to elicit from him all he knew of this disease in his own words. He said that he had long known this disease of sore teats, and that twenty years ago he had had the sores on his fingers, just in the same way as the lads now on the farm. He added that he had no fear of milking the cows, because he was sure he would not get it again. I then asked him to tell me exactly what occurred in the teat from the very first, and he said that it began as a hard pimple on the red teat, that this got a white head, and then there came a blister with watery fluid, which was subsequently broken in the milking. Another cowman added that he had seen the watery fluid get like "brainy stuff" before the blister was broken. Thus, the history of what occurs must be as follows: First, there is a papule and then a vesicle, with first clear and then turbid contents. The vesicle on or before the turbid stage is ruptured by the hand of the milker, and the normal course of development of the pock is interrupted. The irritation of milking twice daily causes extensive ulceration and consequent formation of large fissured crusts; and thus, instead of getting well in about a fortnight, the disease is prolonged for four or five weeks or longer, and when finally healed there is an irregular scar. It is the hand of the milker which is responsible for the striking differences in appearance from the normal pock, such as the absence of pustule and pitting; but as for the reported absence of the initial papule in the Hendon cases, this is easily accounted for by Dr. Cameron's admission that for the earlier symptoms he relied on the statements of others. No doubt these accounts were incomplete, as in the first milkers' description to me. On returning to London in the evening, I confided my convictions to Dr. Curnow, and asked his advice as to bringing the boy to London. Dr. Curnow very kindly arranged to have him admitted to the Seamen's Hospital, Greenwich; and on the following day (Dec. 3rd) I persuaded the boy to accompany me there so as to have him under observation. Suffice it to say that it was a most typical pock, and that lymph taken from the vesicle produced in the calves typical Vaccinia.

Diagnosis from Spurious Forms of Cow-pox.—The characteristic development of the pock on the boy's face and the production of typical Vaccinia in the calf with the lymph were the conditions necessary for proving conclusively that this was the true Cow-pox. The spurious forms are local eruptions on the teats, and are some of them communicable to the hands of the milker. They were recognised by Jenner,* Hering,† and Ceely,‡ and stress was laid on the necessity of being able to diagnose them, as they afforded no immunity from Small-pox. There is only one form—the white or Blister-pock—which is likely to cause difficulty in diagnosis. This disease is of short duration. The vesicles are only sub-epidermic, attain their height in twenty-four hours, are not truly umbilicated, and have no areola, and after bursting form a thin scab. There is no fever.

General Remarks.—Now, sir, the question may occur to you, Is this micrococcus identical with the virus of Vaccinia? I am devoting my attention to this and to the study of any other organisms which may be present in the

* "An Inquiry into the Causes and Effects of the Variolæ Vaccinæ," etc., 1798.
† "Ueber Kuhpocken an Kuhen," 1839.
‡ "Trans. Prov. Med. and Surg. Assoc.," vol. viii., 1840, and vol. x., 1842.

lymph. If it be true that the same streptococcus occurs in Scarlet Fever, Diphtheria, Puerperal Fever, in properly preserved milk, and perhaps, too, in Foot-and-mouth Disease, there can be but little doubt that we have only to deal with a micro-organism, which, when cultivated and inoculated in healthy animals, is capable of setting up a septic inflammation. Indeed, the *post-mortem* appearances observed by Dr. Klein point, in my mind, only to septic complication, which may equally occur in Cow-pox, in Scarlatina, and in other febriile diseases. I think that the explanation of this micrococcus being found occasionally in Scarlatina is that, in severe cases with ulcerated throat, the blood is unable to cope with the invasion of micrococci from the surface lesion. If this be so, the opinion which I wrote early in 1886 concerning the micrococci which had been described in measles applies also to this micrococcus—viz., that in this and in many other cases I only described these organisms as distinct species "from their association with particular diseases, not because they are believed to be casually related, for there is very little evidence in favour of that belief as yet, but purely for convenience of reference. In many cases they are probably only septic organisms which have found a pabulum in dead tissue; others appear to be identical with organisms which have been found in pus."*

Conclusions.—As the practical outcome of this research, I would strongly urge that prompt measures be enforced for isolating diseased animals, and preventing the spread of the disease through the herd. And as the milk is liable to be contaminated with blood, pus, and discharges from the teats, I consider that it would only be consistent with the most elementary rules of sanitation, that only the milk obtained from the healthy cows in the herd should be sent into the market. Such measures, I trust, will lead to the alleviation of much suffering in the cows, ensure greater cleanliness in the milk, and provide another source of vaccine for public use.

SCARLET FEVER, SMALL-POX, AND COW-POX.

In connection with this subject, the following letter appeared in the leading medical journal on December 24th:—

To the Editors of "The Lancet."

Sirs,—In your issue of December 17th you give an abstract of Dr. Klein's paper, read at the Epidemiological Society, on "Some of the Infectious Diseases Common to Man and the Lower Animals," and also an abstract of Professor Crookshank's investigation into the so-called Hendon Cow Disease and its relation to Scarlet Fever in man. With your permission, I would like to make a few remarks on some of the points referred to in these papers, as they are of some importance.

The first is with regard to the relation of human Variola and Cow-pox. The popular notion in this country is that Cow-pox is merely Small-pox modified by its passage through the cow, and Dr. Klein brings forward this notion in support of his contention that the mysterious Cow Disease at Hendon was Scarlatina, or, at any rate, produced that malady in people who partook of the milk of the affected cattle. Now, I have for years, in your columns and elsewhere, maintained that human Variola and Vaccinia are not the same disease, but are quite distinct, and cannot by any known means be transformed. I still maintain this, in the face of the assertions that Ceely, Badcock, and one or two others have succeeded in converting Small-pox into Cow-pox; and if Dr. Klein relies upon these to establish his position with regard to an eruptive mammary disease of cows giving rise to Scarlet Fever in mankind, then I am afraid he stands upon very shaky ground. As Dr. Klein himself acknowledges, he utterly failed to effect the transformation of Small-pox into Cow-pox, even when acting under the direction of Mr. Ceely, and experimenting under the most favourable conditions on more than thirty milch cows

* "Manual of Bacteriology," p. 201.

and heifers. And I will make bold to say that if Dr. Klein carries on experiments all his life in this direction he will be unsuccessful, as have several continental commissions (not alone the French Commission under Chauveau), and every individual—myself among the number—except the three or four above mentioned. Clinically and anatomically they differ widely, and their points of similarity are few and trivial. All attempts to convert Variola into Vaccinia by inoculating cows with Small-pox matter have failed—have failed in the hands of careful and most able experimentalists, and they will fail. But in this case we can resort to our heart's content to experiments upon our own species to prove whether the two maladies are due to one virus—a course which we can so seldom adopt with regard to other diseases. We can inoculate human beings with vaccine virus with the view of transforming Vaccinia into Variola, and if the latter is the former the results in every case should not be doubtful. Transferred to its original soil, the virus should be itself again, and produce Small-pox with all its well-marked features. Since the days of Jenner countless millions of persons have been subjected to this experiment, if we may so designate every-day vaccination; and I ask if there is an instance on record in which Vaccinia became Variola? I certainly know of none. Surely it is as reasonable—if not more so—to attempt to convert Vaccinia into Variola as to transform the latter into Cow-pox. Compare the ease with which Vaccinia can be transmitted from calf to calf, from the latter to the child, and *vice versâ*, throughout endless generations, and without the slightest tendency to become Variola, with the very few recorded cases of supposed production, experimentally, of the disease from Small-pox virus, which was for ever changed by implantation in the body of the cow.

The virus af Cow-pox and that of Small-pox differs in no respect from the viruses of other contagious diseases in regard to preserving its specific potency. The viruses of Anthrax, Tuberculosis, Glanders, Rabies, Scarlatina, Measles, etc., will always produce none other but these diseases, and if the symptoms produced by them when inoculated in other species of creatures than those to which they are native are somewhat different; yet, when carried back to their original soil, they are again the same in everything. I am quite astonished at the way medical men in this country have treated this question of identity of Cow-pox and Small-pox, and accepted the assertion as to this identity without resorting to proof.

With regard to the existence of Scarlatina in cows, or a disease in them which will give rise to that malady in people through ingestion of milk, I am seriously inclined to doubt it. The disorders of cows have been closely studied of late years by veterinary surgeons, and nothing resembling Scarlet Fever had been observed. Scarlet Fever in man, if derived from the cow, would also be that disorder in the bovine. I should not like to be considered dogmatic in the matter, but I think it will eventually be found that a mistake has been made as to this Hendon disease, and that Professor Crookshank is on the right track. We shall then have to express regret that such a panic should have been caused and such serious injury should have been done to a most important industry through over-anxiety and haste to protect the public from a dreaded scourge.

With regard to Professor Crookshank's statement that veterinary surgeons he inquired of informed him that the disease he saw affecting the cows' udders was very well known to them, but was not described in text-books of veterinary medicine, I may mention that in my work on "Veterinary Sanitary Science and Police," published twelve years ago, in the section on Variolous Disease in Animals, I particularly described Cow-pox and the diseases of the udder with which it might be confounded. Cow-pox and Horse-pox are not at all rare diseases.—I am, sirs, yours truly, GEORGE FLEMING,

Dec. 21st, 1887. *Principal Veterinary Surgeon of the Army.*

A DISTINGUISHED REWARD TO A DISTINGUISHED CAREER.

ELSEWHERE we have referred to the mission sent by Her Majesty to King John of Abyssinia, the object of which was to prevent war between that monarch and the Italian Government; and we mentioned that Veterinary-Surgeon Beech, of the Army Veterinary Department, who is temporarily seconded for service with the Egyptian Army, and who has been alluded to in reports of the progress of this mission as Major Beech, accompanied it. The mission, in fact, was composed of only two Englishmen, Messrs. Portal and Beech, and a native interpreter. It is now publicly announced that "The Queen has been pleased to confer a Companionship of the Order of the Bath upon Mr. G. H. Portal, Second Secretary in her Majesty's Diplomatic Service; and a Companionship of the Order of St. Michael and St. George on Mr. J. R. Beech, attached to the Egyptian Army, in recognition of their services in connection with the recent mission to King John of Abyssinia."

This is a most exceptional distinction which has been bestowed on Mr. Beech, as it has never, we believe, been conferred on any one under the grade of field officer, and that of Mr. Beech is only lieutenant, though he holds the rank of major in the Egyptian Army. Besides, he has not yet been seven years in the army, though he was in the Egyptian War of 1882, and was present at the battles of Kassassin and Tel-el-Kebir, for which he received the medal with clasp and bronze star. He was also in the Soudan Campaign of 1884, and was in the battles of Teb (slightly wounded) and Tamai, for which he received two additional clasps, and was honourably mentioned in the *London Gazette* of May 6th, 1884. In the following year he was with the Nile Expedition for the relief of Gordon, crossed the Desert towards Khartoum, and was in the battle of Abu-Klea. For this expedition he received two more clasps, making five in all for Egyptian engagements. This record of service for so young an officer would be difficult to beat; and now comes the high distinction conferred by her Majesty, for his very hazardous mission to Abyssinia, and the manner in which it was accomplished. The profession, we are sure, and especially his brother officers in the Veterinary Department, will feel gratified at this well-deserved honour awarded to our young friend, and will cordially felicitate him on his good fortune, wishing him further honours and continued chances of winning them. Such recognition conferred on one does honour to the whole profession.

CALF-VACCINATION.

THE following is a translation of the more important portions of a memoir on the Belgian central establishment for cultivating vaccine. This establishment is located in the Brussel's Veterinary School, and is under the able direction of Professor Degive, a teacher in that school, who is the author of the memoir. The translation has been made by First-class Veterinary Surgeon Duck, A.V.D., Aldershot, who recently visited the institution.

The vaccine is cultivated from calves of three or four months old, and weighing at least 100 kilos. (about 220 lbs.). These calves are procured from a butcher in the town by a special agreement. The director takes care that every calf is in a perfect state of health. Immediately after the crop of vaccine has been taken the calves are destroyed and the carcases carefully examined *post-mortem*. If there be any sign of disease in an animal, the vaccine obtained from that source is destroyed.

Vaccine Production.—Vaccine production comprises four operations:—

(1) The insertion or sowing; (2) The crop or harvest; (3) The preparation; (4) The preservation.

(1) *The Insertion or Sowing.*—The calf is securely fixed on a special operating table. This table is provided with rings and straps for securing the head, fore extremities, and the left hind leg; a vertical bar terminating in a ring keeps the right hind leg extended and raised from the body; there are also two zinc reservoirs in suitable positions to catch the urine and the fæces. The incisions are made over the right of the abdominal region, and over the scrotum. They are about 2 to 3 centimetres in length, and are cut or scratched through the upper layer of skin. Those over the abdominal portion are transversely placed, the distance between each being 3 or 4 centimetres. They are placed chequerwise in parallel series to the long axis of the body. The scrotal incisions follow the line of the testicles, and are closer together. The ordinary number of incisions varies from 60 to 80, of these 16 to 18 are scrotal, and 46 to 64 are abdominal. The parts selected for the operation are shaved and carefully cleaned. The skin is then lightly stretched and divided with the point of a lancet or of a sharp straight bistoury. After the incisions are made a damp cloth is used to wipe away any drops of blood, then the insertion of the vaccine is commenced. The vaccinal seed or vaccine that answers best in our cultures is the glycerine pulp of which we shall speak later on. A small ivory spatula is used to deposit the pulp in the incisions, and to facilitate this the skin is lightly pressed to open the lips. In about 10 or 15 minutes time, when the inoculating material is somewhat concentrated by evaporation, the calf is released and put in the stable. To prevent touching or scratching the inoculated parts, cradles and heel-ropes are used. The stable is roomy and well ventilated, and is kept at a mean temperature of 18° C. In winter the temperature is kept up by a thermo-syphon. On the sixth, sometimes on the fifth day the pustules are sufficiently developed for the second operation—*i.e.*, the collection of the crop or harvest. They are then very striking, exhibit a central crust, brownish-yellow, or whitish-silver like zinc, more or less developed, surrounded by a light areola of reddish hue.

(2) *The Crop or Harvest.*—There are two principal things to take in the vaccinal pustule—the one a serous, limpid part, the lymph; the other a greyish, half-solid, more or less soft substance, the pulp. This last is formed by the tissue, the pulpy substance (*parenchyme*) of the pustule. At the present time it is recognised that of these two substances the pulp is much richer than the lymph in virulent elements, and stronger in vaccinal activity. Thus we have now discontinued the use of pure lymph, and we now employ the pulp.

The following is the method we now use in collecting or harvesting the pulp:—The calf is secured on the table, as in the previous process, and the inoculated portion is cleansed with a cloth dipped in cold or tepid water. Each pustule is compressed in a specially prepared forceps (*pince de péau*), the crust is removed with a lancet and put aside; any blood that may flow from the pressure of the forceps, is stanched with a clean cloth; then the soft, pulpy, greyish substance is scraped off and placed in a small porcelain cup. After this has been gathered, the calf is slaughtered and *post-mortem* examination made. Should there be any sign of disease the vaccine is not used.

(3) *Vaccine Preparation.*—The vaccinal pulp thus collected is used to make the following preparations:—(*a*) The pulp "Glycérineé"; (*b*) The pulp "Glycérolée"; (*c*) The liquid vaccine; (*d*) The dry vaccine.

(*a*) *Pulp Glycérineé.*—The raw vaccinal pulp is placed in a mortar to be divided (triturated) into a mass as homogeneous as possible. To this is

added and mixed a certain quantity—a third or a half—of glycerine, chemically pure or with the addition of one per cent. of phemi acid. By this means is obtained a sufficiently fluid pulp of a syrupy consistency, endowed with pronounced virulent energy, and capable of being kept for many weeks or even months. This pulp is *exclusively* used for the inoculation of calves destined to keep up the supply of vaccine. Until required for use it is kept in white or brown glass tubes, like the fingers of a glove, in length about two to three centimetres, in breadth from three to eight millemetres. These tubes are corked and enclosed in tinfoil paper.

(*b*) *Pulp Glycérolé.*—This is prepared in the same manner as the above; it is formed from a mixture of equal parts of raw pulp and of "Glycérioléé" starch. It constitutes the most efficacious and the most used matter for the inoculation of the human subject. It is preserved and forwarded between two small glass slides, or in finger-glove tubes. The glass slides are peculiar; one of them has a central depression of elliptical form, into which the vaccine is deposited; the whole is enclosed in metallic paper. The slides contain sufficient for from two to five people. The tubes hold large quantities sufficient for from ten to 100 people.

(*c*) *Liquid Vaccine.*—After the removal of the pulpy substance from the pustule, and as a result of the scraping, there is an exudation of a serous, limpid fluid; this is the vaccinal lymph. This liquid is collected with an ivory spatula and deposited in a porcelain cup. The vaccinal lymph alone, or with the addition of glycerine, or of glycerinated water and a small quantity of pulp, constitutes the liquid vaccine. To prepare this, the fresh pulp is diluted with equal parts of glycerine and of *vaccinal lymph*, and then filtered (*étoile en fil de cuivre*). When the supply of lymph is not sufficient to fill all the tubes distilled water is added. As the filtered liquid contains a certain proportion of the solid elements of the pulp, there is a difficulty in getting it into the capillary tubes. To overcome this the liquid is aspirated into the tubes by the mouth in front of a mirror, or else (and preferably) through the means of an india-rubber tube or quill provided with a glass mouthpiece; one extremity of the capillary tube is inserted into the india-rubber tube or quill, and held by two fingers; it is now only necessary to put the mouthpiece between the lips and aspire lightly to draw the liquid into the capillary tube. By this method—the invention of M. Gratia—any accident from the introduction of vaccine into the mouth is prevented. The capillary tube is filled up to within a centimetre of the extremity within the aspirator, and is then closed cold by putting both ends into a mixture of equal parts of suet and paraffin. In this way the tube is closed at each extremity by a small whitish cylinder of the length of half a centimetre, without the interposition of the smallest quantity of air.

(*d*) *Vaccine on Ivory Points.*—These ivory points are three centimetres long, and about six millimetres broad. To charge these points a certain quantity of vaccine liquid rich in solid elements is prepared. The triturated pulp is then diluted in pure vaccinal lymph, or in distilled water, and then filtered in the above described manner. The points are then dipped twice, care being taken that they are dried each time, and that only one surface is wetted. As soon as prepared they are placed (the extremities tapering down) on the rim that runs round the under portion of a common plate. The drying takes place in the sun or before an ordinary fireside, the heat of which should not exceed 35°C. To ensure the preservation of the vaccine the portion covered with the material is then dipped in gum and dried.

(*e*) *Powdered Vaccine.*—Vaccine powdered is obtained by a simple and economical method. The fresh pulp, after being collected, is exposed upon a glass slide. This is placed under a bell-shaped vessel, the border of

which rests upon a plate of unpolished glass, within which there is a receptacle containing some sulphuric acid. An india-rubber tube placed in the interior of the vessel communicating with a simple glass pipe fitted on to a spigot of town-water creates a vacuum rather like a barometric vacuum. Under the double influence of this vacuum and of the sulphuric acid, vaccinal pulp is soon dried. After at the most twenty-four hours it can be reduced to powder and put up in cardboard boxes.

(4) *Preservation of Vaccine.*—To preserve as far as possible in this vaccine its transmissible potency it must be kept under conditions which will prevent its being altered or its activity diminished. It must be protected from heat, light, air (oxygen), and moisture. With the object of safeguarding the vaccine from these influences the ivory points and the boxes containing the vaccinal powder are placed in narrow-mouthed, dark glass vessels, and kept in a dry place. The liquid vaccine and the vaccinal pulp are put in a cupboard, and kept in as fresh a place as possible. In hot weather the tubes and slides are kept in a suitable ice-house.

A statistical register is kept for each inoculated subject, description, dates of entry, of inoculation, of collection and discharge, the number of the vaccination, the inoculated material, the number of insertions and of pustules, the weight at entrance and discharge, the amount of the collection, observations on the general health, and *post-mortem* lesions if death occurs.

Reviews.

GLANDERS: HOW IT ARISES AND SPREADS; HOW TO PREVENT IT; AND HOW TO STAMP IT OUT. By W. HUNTING, F.R.C.V.S. (London: H. and W. Brown. 1887.)

In a little book of eighty-two pages, Mr. Hunting gives a popular exposition of the serious disease known as Glanders, and of the measures which should be adopted for its suppression. There is nothing of novelty in the views he expresses, which are chiefly those of every one who has had experience of the troublesome malady; but we suppose the book was not intended for the veterinary profession, but rather for the public who have to do with horses, and who are liable to, or do really suffer from, its ravages in their stables. With nearly everything Mr. Hunting states, in treating of the pathology of Glanders, we entirely concur, and we are in full agreement with his preventive and suppressive measures. We might take objection to his statement that the poison of the disease is not volatile; our experience leads us to believe that, under certain circumstances, it is so, and we could give powerful facts in support of this belief. It is best, at any rate, in dealing with such an insidious and destructive disorder, to err on the safe side, and the acceptance of the opinion that the virus may become volatilised is to be recommended. There is no harm likely to arise from the application of measures based on this opinion, whereas there is danger, we are convinced, in entertaining the notion promulgated by Mr. Hunting. In our army, which was half-a-century ago a hotbed of Glanders, but which is now entirely free from it, not a case having occurred during 1887, the measures adopted are founded on the experience that the virus may be volatile, as well as fixed.

With regard to the cause of Glanders, Mr. Hunting is of opinion that it is due solely to contagion, and in this we also concur. He rather goes out of his way, however, to attack the opinion expressed by Dr. Fleming in his work on "Veterinary Sanitary Science and Police," to the effect that the disease arises spontaneously. That work was written in 1874, and published early in 1875 (not ten years ago, as Mr. Hunting asserts), and such was the view then entertained by all the leading veterinarians in this country and on the Continent; while it has been insisted on in text-books on veterinary medicine and popular works on the horse, written by veterinary surgeons, up to quite a recent period. Indeed, if we are not misinformed, veterinary teachers at the present time believe and teach that Glanders may be due to other causes than contagion, and certainly one of them has stated this in his book, published at least five years after Dr. Fleming's Manual. But particularly startling is the fact that Mr. Hunting himself once rather believed in its spontaneity, and printed his belief months after the appearance of that work. In the first volume of the VETERINARY JOURNAL (July, 1875) that gentleman has an article on the disease in question, and at page 2 he states: "Of every hundred cases ninety-nine are due to contagion, and *probably* the hundredth is traceable to the same cause, if we could only follow the hidden mode of communication." When the probability became a certainty in his mind the author does not inform us, but it possibly was when the views of Dr. Fleming and others were changed several years ago.

So far, however, from the notion of the spontaneous origin of Glanders being productive of harm, it may be truthfully asserted that it has had a most beneficial effect, as it led to improved stables and management of horses, and, in fact, compelled indifferent people to adopt troublesome and expensive hygienic measures which they would have been little inclined to do, perhaps, if they had thought Glanders was not due to insanitary causes. Therefore the error in pathology was one on the proper side; and though we may now wonder why such an error ever existed, yet it must be remembered we all—Mr. Hunting included—know more about this redoubtable malady at the present time than we did twelve, ten, aye, two years ago.

There are one or two disputable points which the author raises, besides that relating to the volatility of the virus, that might be examined, but we forbear, and conclude by recommending the booklet to those who wish to know what should be done in order to get rid of Glanders.

SPRAINS: THEIR CONSEQUENCES AND TREATMENT. By C. W. MANSELL MOULLIN, M.A., etc. (London: H. K. Lewis. 1887.)

There is, perhaps, no injury which occurs more frequently in animals, and for which the aid of the veterinary surgeon is invoked, than sprain—be it of muscle, tendon, or ligament. And in no animal is this injury so frequent, or of so much moment, as in the horse: from the fact that, owing to the nature of its services to man, it is most exposed to this lesion; that these services only too frequently militate against a permanent cure; and also because, of all the domesticated animals, the

horse is the most valuable. But in itself, sprain is essentially the same, whether it occurs in man or beast, and the indications for effective treatment do not differ in either; though it must be confessed that nearly always the veterinary surgeon labours under great, nay, most serious, disadvantages when compared with those the surgeon has to encounter. Mr. Moullin's book on sprains must, by both classes of practitioners, be accepted as the best contribution to the subject of any which has yet appeared, and should receive the most careful consideration from them, especially with regard to the *rationale* of treatment—oftentimes so unsatisfactory. Based upon the most modern pathology, and evincing a thorough knowledge of the subject, no better guide could be found than Mr. Moullin's handy little treatise.

Proceedings of Veterinary Medical Societies, &c.

CENTRAL VETERINARY MEDICAL SOCIETY.

At an ordinary general meeting, held on 1st Dec., 1887, at the First Avenue Hotel, Holborn (Mr. Sheather, the President, in the chair), the following Fellows attended:—Professor Axe, Messrs. J. Hall-Brown, Alfred Broad, James Broad, Chesterman, Cheesman, Elworthy, Hunting, Lowe, Oatway, Overed, Price, Raymond, Rickards, Irwin-Roberts, Rowe, Roots, Samson, F. Smith, Slocock, Willis, Woodger, Wragg, and the Secretary. Professor Crookshank, Messrs. Cordy, Halford, Hawes, Loveridge, Perry, and William Wilson were present as visitors.

The minutes of the preceding meeting were read and confirmed.

Letters were read from Professors Pritchard and Walley, and from Mr. Harrison, of Hertford.

Mr. Henry Edgar, of Dartford; Mr. J. S. Hurndall, of Blackheath; and Mr. H. M. Singleton, of Ealing, were elected Fellows of the Society.

Messrs. H. W. Farrow and Arthur Rogerson were nominated for Fellowship.

Mr. Irwin-Roberts brought before the meeting the brain of a horse, having a Tumour in the right lateral ventricle; the weight of the Tumour when fresh was $1\frac{3}{4}$ ounces. Mr. Roberts gave details of the case.

The President remarked on the extraordinary size to which Tumours would grow in the ventricles of the brain before any symptoms of their presence were shown. In the majority of cases the symptoms set in suddenly after the Tumour had become large, and death soon ensued. He did not think that the cause of these Tumours was very distinctly understood. In two or three cases which had come under his notice the Tumours were largely made up of Cholerterin.

Prof. Axe then gave a very interesting and scientific lecture on the subject, "The Cow in Relation to Scarlatina of Man,"* in which, while recognising the interchangeability between the lower animals and the human subject of some diseases, such as Tuberculosis, Anthrax, Glanders, and Rabies, he disputed the conclusion to which Dr. Klein and others have arrived, viz., that the extensive outbreak of Scarlatina in the North-West district of London, in 1885, was due to the elaboration of the virus of Scarlatina in the systems of certain cows kept on a farm at Hendon; and he pointed out the much greater probability of the milk having been contaminated by human agency, especially as

* Professor Axe's lecture will be printed in pamphlet form at an early date.

some cases of Scarlatina were known to exist at that time in the immediate neighbourhood of the Hendon Dairy Farm.

In the discussion which followed, Mr. HUNTING said that the whole of Professor Axe's remarks went to damage that respect in which they indulged for pathology. He thought that there had lately been a tendency to overlook the importance of clinical work and to magnify the importance of laboratory proceedings. The whole clinical history of the Hendon cow disease, as shown by Professor Axe, pointed clearly to the disease not being communicable to man, and to the Scarlatina organism individualised by Dr. Klein not being an organism which produced any specific disease in the lower animals.

Mr. SAMSON did not believe that the disease of cows' teats produced Scarlatina in man. He had a great many times treated cows suffering from the eruption, but had never known cowmen or their children affected with Scarlatina from being in contact with the diseased animals or from drinking their milk.

Prof CROOKSHANK said that he felt that the remarks which had been made with regard to the time and attention given to cultivating micro-organisms were quite justified. Those present might be surprised to hear this statement from a bacteriologist, but he could assure them that those bacteriologists who did not forget that they were also practical pathologists were very opposed to any researches which were not most thorough in all their details, and, moreover, admitted of repetition and demonstration in the hands of others. Bacteriology was of immense value as a part of pathology. In many diseases the pathogenic role of a micro-organism had been distinctly proved, but that was no reason why the germ-theory should be accepted for every communicable disease. He found there was a great tendency on the part of some investigators to rush into print, which was one of the easiest ways of gaining notoriety.

In a great many diseases, and, indeed, also in conditions of health, there are micro-organisms present on the skin and mucous membrane which, when isolated and cultivated, were capable of producing disease in the lower animals.

The announcement of the discovery of a new micro-organism was sometimes based upon insufficient research, and he was quite ready to admit that rushing to extravagant conclusions upon very slight evidence had brought genuine pathological work into discredit in the eyes of many eminent practical men.

No work could be accepted as genuine unless based upon the famous postulates of Koch, which were, firstly, that the organism must *always* be found in connection with the disease in the blood or in the tissues; secondly, that this organism must be cultivated apart from the blood or the tissues, and it must be carried through successive generations of artificial cultivations; thirdly, that the disease must be reproduced with inoculation of such a cultivation, and that in the disease thus produced the organism which was present in the original disease must again be found. When this chain of evidence is complete, then, and then only, are we justified in saying that the organism was undoubtedly the principal agent in the production of the disease in question; but if that chain of evidence was not completed, we are only justified in saying that the organism was associated with the disease. In conclusion, Dr. Crookshank invited Fellows of the Society to be present at a meeting of the Pathological Society on December 15th, when his report on the Milk-Scarlatina question would be read.

Mr. SHEATHER was very pleased that the question as to the value of the study of bacteriology had been introduced. In spite of the great harm which had been done by the injudicious and rash publication of so-called results which could not afterwards be verified, he had no doubt but that the

value of bacteriology in the diagnosis of disease would soon be generally recognised.

In answer to queries from Messrs. Wilson, Hunting, Raymond, and F. Smith, Prof. AXE replied, that in the several outbreaks of the cow disease to which he had referred, a number of the persons who were engaged in the milking became inoculated with the virus in sores on their hands such persons did not suffer from Scarlatina, but developed changes in the skin and fingers of the same nature as those which existed upon the teats of cows. This eruption was no new disease of the cow. He believed he had known it for many years, and had seen it in many counties. He (Prof. Axe) did not know Dr. Klein's reasons for not using the blood of Scarlatina patients for inoculating the experimental animals, but this void had been filled by the Edinburgh Commission, which did use the blood, so that altogether experiments had been conducted with the micro-purulent throat discharges, the cutaneous desquamation, and with the blood of persons suffering from Scarlatina, and neither of them seemed capable of producing in the animals inoculated anything which can be assimilated to Scarlatina.

The PRESIDENT proposed, and Mr. SAMSON seconded, a vote of thanks to Prof. Axe for his lecture, which was carried unanimously.

SIDNEY VILLAR, *Hon. Sec.*

MIDLAND COUNTIES VETERINARY MEDICAL ASSOCIATION.

THE sixty-first meeting of the above Association was held at the George Hotel, Northampton, on October 14th, 1887.

Prior to the meeting the members were entertained at luncheon by Mr. T. J. Merrick.

Mr. J. M. Parker, President, occupied the chair, and there were present Professor Pritchard, London; Messrs. F. W. Wragg, London; R. G. Verney, Stratford-on-Avon; H. D. Pritchard, Wolverhampton; A. Over, Rugby; J. L. Barber, Rugby; Capt. Russell, Grantham; Messrs. T. Greaves, Manchester; T. J. Merrick and T. H. Merrick, Northampton; S. J. Marriott, Northampton; J. H. Reynolds, Daventry; H. Blunt, Lutterworth; W. Carless, Stafford; B. Freer, Uppingham; H. Olver, Tamworth; J. Wiggins, Market Harboro'; J. Malcolm, Birmingham; B. B. Aris, Wellingborough; and T. Chambers (Hon. Sec.), Dudley.

Visitors: P. A. Muntz, Esq., M.P., and Mr. Ewart Dunsmore, Rugby. Letters of apology were received from Sir Henry Simpson, Windsor; Professor Walley, Edinburgh; Messrs. J. L. Barling, Hereford; Martin, Chesterfield; J. G. Cross, Shrewsbury; F. Blakeney (Treasurer), Stourbridge; H. R. Perrins, Worcester; E. Price, Birmingham; and R. C. Trigger, Newcastle-under-Lyme.

The Hon. Sec. read the minutes of the last meeting, which were confirmed.

Mr. F. L. Gooch, of Stamford, Mr. S. J. Marriott, of Northampton, and F. B. Jones, of Leicester, were elected members of the Association.

The PRESIDENT called upon Professor Pritchard to deliver his lecture on "Sidebone."

The Professor said, with a view to leading his audience to the importance of his subject, he dealt briefly with that portion of the anatomy of the horse's foot involved more particularly with the malady he had selected for his lecture. He laid stress on the fact that although the pedal bone, with the lower half of the coronæ and the navicular bone, constituted the ossific basement structure of the foot, the lateral cartilages with their appendages entered very largely into the formation of such basement material of the organ, they forming more than one half of it. With the assistance of specimen, he showed that these structures extended very nearly as far forward as the

extensor pedis tendon, as far back as the extreme posterior part of the internal portion of the hoof, from an inch to an inch and a half above the hoof, and downwards to the internal surface of the horny sole. He then showed that these cartilages had some very important relations with other structures, and dwelt upon the fact that among other parts in apposition with and attached to them was very nearly the whole of the coronary secreting substance, the band from which the bulk of the wall or crust of the hoof is secreted—a fact to which, in his opinion, the shape of the foot was entirely due. Some of the other principal functions of these cartilages were then dealt with, and the Professor passed on to speak of the disease Sidebone.

Its pathology he described as a calcification or ossification of a portion or the whole of the lateral cartilages, and endeavoured to impress upon the meeting that the transformation of tissue, although very frequently extending from the alæ of the pedal bone in a direction upwards and backwards or forwards, not at all uncommonly commences near the centre, and in some instances in close proximity to the upper margin of the structure. He laid particular stress upon this point, more especially on account of the necessity of the practitioners bearing the fact in mind when determining as to the existence of Sidebone or otherwise.

The causes of the disease were next reviewed; firstly, dealing with the question of hereditary predisposition, and expressing a decided opinion that the malady was transmitted from the sires and dams to the progeny, supporting such opinion by quoting instances which had come under his notice, and drawing attention to the fact of the few cases of Sidebone seen in horses sent for exhibition at the present day, compared with the number which used to be met with in the show rings, when shows of cart-horses were first instituted some sixteen years since, and strict professional examinations made with a view to rejection of all unsound entries. He considered this measure imposed upon would-be exhibitors the necessity of a more careful selection of parent animals, and that, as a consequence, the production of a sounder progeny took place. He further stated on this point that he firmly believed that, if as much care were taken in the selection of the parent animals of cart-horses, as was observed in those of lighter breeds, Sidebones would be as rare in the former as in the latter. As another and not unfrequent cause of Sidebone—injury from external violence: a careless carter dropping the shaft of his cart upon the horse's coronet, a tread from the horse's other foot, or from another horse when working in pairs—in such way bruising and setting up inflammation in the tissues in connection with the cartilage. He pointed out that in this way the fact of a single Sidebone appearing far more frequently on the outer than on the inner side of the foot was to be accounted for. A very fruitful cause of Sidebone, drawn attention to, was that of concussion, produced by horses being called upon to travel on roughly-paved roads, or with improperly-adapted shoes, a cause more particularly in operation in horses with flat feet with low weak heels. It was pointed out that to the fact of the horses having mainly to be supported by the fore limbs, and they, consequently, subjected to a much greater amount of concussion than the hind, Sidebone is so much frequently found in the fore feet. On the question of the policy of breeding from a horse having a Sidebone caused by accident, the lecturer said that in his opinion if the affected state of the coronet was unquestionably the result of a local cause, it would be quite safe to breed from him or her; but that before such an animal were selected for the purpose, the cause of the Sidebone should be beyond all doubt.

The lecturer next dealt with the symptoms of the disease, pointing out that, of all others, the rigid state of that part of the lateral cartilage extending above the hoof was the diagnostic one; that in the majority of cases there was little difficulty in determining its existence or otherwise, although in some instances

where the base of the cartilage, in proximity to the wing of the pedal bone, was the only affected part, the matter of determining its existence was one of very considerable difficulty.

He advised that when being examined, the horse should be allowed to stand fairly upon his feet, so as to impart a proper amount of tension to the cartilages; pressure should then be applied with the finger and thumb over the region of the cartilage, to determine whether it possessed the normal amount of elasticity. He had seen persons examine by taking up the foot and testing the cartilage by moving it inwards and outwards, but he looked upon this as a very unreliable test, and backed up this view by reminding his audience of what he had said respecting the upper part of the cartilage, in many instances alone being ossified, and pointing out that in such a case it would readily move inwards and outwards, and consequently such an examination would be very much calculated to mislead. On the other hand, he deprecated having one foot held up while the other was being examined, considering that unusual weight imposed upon it is calculated to render the cartilages so tense as to cause the examiner to suspect that the base of one, or both, were diseased. Lameness was, he found, a very frequent attendant of the malady, more particularly in horses with weak feet, and a lameness which, owing to the nature of the affection, was very difficult to get rid of.

The cause giving rise to the lameness was next dealt with. It was pointed out that several opinions regarding it were held. Undue force upon the external surface of the cartilage, imparting unusual pressure to the laminæ, an interference with the function of the structures in apposition with the internal surface of the cartilage, the unyielding condition of the cartilage, and others, had been advanced.

The lecturer held the opinion that the movement which took place in the posterior half of the foot, a movement which unquestionably occurred every time the animal's weight was placed upon it—not a lateral expansion, as taught years back, but one in a direction forwards and backwards, and a movement with which the elasticity of the healthy cartilages contributed largely to, was so seriously interfered with they could not properly perform their functions, and lameness was the result. The lecture was brought to a close by some general remarks as to the various modes of treatment which were had recourse to. It was pointed out that cure was impossible, and consequently that what was done in way of treatment was carried out solely with a view to relieve lameness; blistering, firing, the application of modified shoes, and neurotomy, were the various plans named as usually being had recourse to, and in some instances of bodily removal of the affected cartilages; but the lecturer was of opinion that, with the exception of neurotomy—the so-called high operation which he advised—in the large majority of cases treatment was not followed by the desired result.

A very animated discussion followed, in which Messrs. Greaves, T. J. Merrick, J. Malcolm, F. Wragg, Captain Russell, Verney, H. Olver, Wiggins, Blunt, A. Over, P. A. Muntz, Esq., M.P., and the Hon. Sec. took part.

Mr. OLVER proposed, and Captain RUSSELL seconded, a vote of thanks to Professor Pritchard for his admirable lecture.

Mr. WIGGINS proposed a vote of thanks to Mr. Muntz for his attendance that day, and for the valuable questions he, as a large breeder of horses, had asked.

Mr. OVER seconded the proposition, and it was unanimously agreed to.

Mr. MUNTZ in replying, spoke of the pleasure it gave him to be present at that meeting. His object in attending was to educate himself on the question of Sidebone, and he had received a great deal of valuable information from the address, and the discussion which had followed it. One of the

greatest difficulties the farmer who bred horses had to contend with was Sidebone, and if anything could be done by the veterinary profession to check its spread, they would be conferring a great boon upon the agricultural community. He was of opinion that Sidebone was largely due to locality, and he hoped that question would receive future consideration.

A vote of thanks to the Chairman was proposed by Professor PRITCHARD, and seconded by P. A. MUNTZ, Esq., M.P., and carried unanimously.

The Chairman having briefly responded, the proceedings terminated.

The members present afterwards dined together.

T. CHAMBERS, *Hon. Sec.*

SCOTTISH METROPOLITAN VETERINARY MEDICAL SOCIETY.

THE usual quarterly meeting of the Society was held in the London Hotel, on Wednesday, the 23rd November. The President, Mr. Burnett, of Maybole, was in the chair. There was a very fair attendance of members.

The minutes of the last meeting were read and confirmed.

Professor WALLEY proposed the following six gentlemen for election as members:—Messrs. Smart, Grossart, Gilchrist, Player, Young, and Reid. Seconded by Mr. A. BAIRD.

Mr. CUNNINGHAM, as an amendment, proposed that these young men be not elected until after the general meeting in February. He thought it was unfair to allow them to have a vote in the affairs of the Society at such a critical time. The Society had come to the parting of two ways, when it seemed impossible for it to exist in its present state. There were two distinct parties in the Society, and there were members enough on each side, in the event of a dissolution, to form two new Scottish Societies. While proposing this amendment, he would at the same time give notice of the following motion for next meeting:—

"That at the annual general meeting in February, 1888, this, the Scottish Metropolitan Veterinary Medical Society be dissolved; a small committee being first appointed, with powers to sell or dispose of the effects of the Society, uplift its funds, pay its debts, and hand over the surplus to the Veterinary Benevolent Fund, in the hope that, soon after the dissolution of this Society, two other fresh Scottish Veterinary Medical Associations will be formed."

The motion and amendment were then put to the vote. Six voted for Professor Walley's motion, and seven voted for Mr. Cunningham's amendment. The latter was accordingly carried.

Professor WALLEY said he looked upon this as a deliberate and prearranged insult to himself and to the gentlemen he had proposed. In his experience of veterinary associations he had never known of a similar step being taken on the election of gentlemen as members, and looking at it in the light of an insult he could not remain in the Society. Professor Walley accordingly at this point left the meeting.

Professor WILLIAMS remarked, that so far from Mr. Cunningham's amendment and notice of motion being prearranged, he had not heard of them until that morning. He (Professor Williams) regretted that the President had seen fit to write a letter to the members putting the existing quarrel as a question between the two schools. He repudiated it as such, and asserted that it was a question between two persons.

The PRESIDENT said he was sorry Professor Williams had taken his letter up in that light, as he certainly did not intend it to be so read.

The election of office-bearers was then proceeded with.

Mr. CUNNINGHAM proposed Professor Lewis as President, seconded by Mr. BORTHWICK.

Professor LEWIS thought that an older member should take the responsibility at the present crisis, and he would accordingly propose that Mr. Borthwick be elected to the chair.

Mr. BORTHWICK declined to accept the position.

Professor WILLIAMS proposed the re-election of Mr. Burnett, which was, however, declined by that gentleman.

After a time Professor Lewis was persuaded to accept office.

The following gentlemen were elected Vice-Presidents :—

Mr. Borthwick, proposed by Mr. CUNNINGHAM, seconded by Professor LEWIS.

Mr. A. Baird, proposed by Mr. HUTTON, seconded by Mr. BARCLAY.

Mr. Aitken, jun., Edinburgh, proposed by Professor LEWIS, seconded by Mr. CUNNINGHAM.

Mr. Fairbairn, of Cupar, was elected Secretary. Proposed by Mr. A. BAIRD seconded by Mr. STORRIE.

The same gentleman was also elected Treasurer. Proposed by Mr. W. O. WILLIAMS, seconded by Mr. STORRIE.

The PRESIDENT next read the following paper on

Rheumatism.

GENTLEMEN,—I was requested by our Secretary to bring before this meeting either a paper or some interesting cases. I was afraid time would not allow me to prepare a paper, but as there was none forthcoming I have put briefly together a few remarks on Rheumatism, and at the end of which I will bring before your notice the history of a case connected with the same. Rheumatism is a word of Greek origin. The Greek word *rheumatismos* signifies a flux or looseness; *rheumatisomai*, to be affected with looseness—from *reuma*, a humour floating in the body causing disease.

Rheumatism may be defined to be an acute febrile disease, caused by certain morbid matters circulating in the system and climatic influences, and with severe pain in the articulations and fibro-serous membranes and muscles throughout the body.

The first question that naturally presents itself to us is, What is Rheumatism? Many attempts have been made to determine the exact nature of the materies morbi rheumatici. Various and conflicting are the opinions given by the leading pathologists of the past and present regarding the nature of this disease, which up to the present time have not been satisfactorily answered. Lactic acid, the nervous, infective, germ and malarial theories, and an excess of fibrin in the blood—hyperinosis, as it is termed—have each their claimants as being the cause of this disease. And the nature of the poison, if there be such, in the system is, in my opinion, still an open question.

I will now briefly bring before you the opinion of a few of the leading pathologists regarding the nature of this disease. Drs. Prout and Todd and many other leading pathologists believe it to be due to an excess of lactic acid in the system generally, and that the superabundance of lactic acid is caused by that ordinarily the starch of the food is first converted into lactic acid; this then combines with oxygen to form carbonic acid and water, which is excreted by the lungs, but, under conditions unfavourable to this oxidation, the lactic acid accumulates in the system. Dr. B. W. Richardson and Mr. Simon have proved by experiments that the injection of lactic acid into the system will produce symptoms of cardiac inflammation resembling rheumatic endo and pericarditis. But would not the injection of other acids cause the same thing? Dr. Garrod has failed to detect any morbid principle in the serum of the blood, and has generally found an absence of any specific alteration in the urine.

Canstatt and Seitz advance the nervous theory—that cold acting on the skin and joints causes disturbance of corresponding parts of the central nervous system, and this gives rise to pain and vaso-motor or trophic changes of the same peripheral parts, and to Fever.

Senator favours the combination of the lactic acid and nervous theory. He believes that cold acting externally causes retention of lactic acid in the system, and this acts on the central nervous system, and the disordered nervous centres react upon the joints, etc.

Hunter believes in the infective theory—that with a chill micrococci enter into the system, and Endocarditis is the result, and that the joint symptoms are secondary and embolic, as in Pyæmic Arthritis.

Salisbury favours the germ theory of the disease, and that it is due to a vegetable organism in the blood, *Synostosis translucens*.

Maclagan advances the malarial theory of the disease, and that it is due to a poison in the system of the nature of a miasm taken into the system from without, and that this miasm is generically allied to, but specifically distinct from, the miasm of Malarial fever.

Fuller believes that cold and other external agencies are only predisposing and exciting causes of Rheumatism, and that the primary, proximate, or essential cause of the disease is the presence of a morbid matter in the blood, generated in the system as the product of a peculiar form of malassimilation of vicious metamorphic action. The opinion is entertained by many leading pathologists that an excess of fibrin in the blood is in a great measure the cause of this disease, and that the excess is always antecedent to an attack of Rheumatic Fever, and I have no doubt but you can all testify to the fact that the attacks are most severe in plethoric animals, but still I am not inclined to think that the excess of fibrin is the cause of the disease.

I am inclined to believe in the opinion formed by Mr. Fuller, that the cold is the exciting cause, and that there is some morbid matter in the blood as the primary cause of the disease, but I think it is not essential to have malassimilation to produce this morbid matter in the blood. For instance, take a day in the month of April or May, with a hot sun and a cold dry air. Between the heat of the sun and hard work the animal gets very much heated, and the cold air, acting on the skin and articulations, prevents the perspiration with the morbid matter being thrown off by the skin as one of the three great emunctories of the body, and is therefore thrown back on the system; but still there is something required to produce the disease, and that is five or ten minutes' rest to allow the animal to cool down quickly; for what is more common than for a party to drive into town and stand for a short time in a draught? and then the animal begins to show signs of stiffness, and ultimately becomes so bad as to be unable to go home. But the same thing is to be seen oftener in the heavy breed of horses by being allowed to stand for a short time at the land end in the plough or some other agricultural implement. Or, for example, an animal is put into the stable at night very warm, and when he is seen in the morning he is unable to move out of the stall. Another peculiarity about Rheumatism attacking the horse is that the largest percentage attacked are of a dark-brown colour, a near approach to black, and the only reason I can advance for it is this—that they are less liable to perspire than any other colour. I have made inquiries of coachmen and others, and they endorse my opinion that this colour of horse perspires less than any other.

And we also find that certain years and seasons are more productive of Rheumatism than others, due, no doubt, to some peculiar atmospheric condition. And we also find a number of animals attacked at the same time, both horses, cattle, and dogs. I had this year at a gentleman's seat two carriage horses

and a dairy cow suffering from this disease all at the same time, likewise horses, cattle, and dogs in different parts of the district.

Without entering further into a speculative discussion concerning the different theories I have laid before you, I will leave it to you during the discussion which I hope will ensue to throw more light on the subject.

I will now draw your attention to the divisions into which Rheumatism may be divided; and I think, for all practical purposes, the most useful divisions are into acute, subacute, and chronic. To one of these the various tissues of the body affected may be referred, as the capsular, muscular, periosteal, etc. Rheumatism is also associated with some other diseases, as Influenza, Epizootic Cuilulitis, Azoturia, or Hæmoglobinuria, and Rheumatism following sprains, etc.

Symptoms of Acute Rheumatism.—Acute Rheumatism is ushered in by rigors or shiverings, followed by increased heat, frequent pulse, accelerated breathing, shifting of the limbs, or there may be stiffness of the neck or loins pain gradually increases, the animal begins to perspire, pains come in paroxysms, respirations more accelerated, dilated nostrils, and anxious countenance; pressure on the tendons of muscles, at the articulations, or wherever the disease is located, the animal evinces much pain. One joint, or several, or nearly every joint in the body may be affected; and in those cases where only one or two articulations are affected the disease generally exhibits a greater tendency to shift from joint to joint, or to the muscles of the loins, intercostal muscles, or to those of the neck, and to the heart itself. I witnessed a case where the heart was very early affected. On my arrival the horse had the skin opposite the heart torn off with his teeth. I turned him in the stall, and gave him a draught, and by the time I had given it to him the disease had located itself in his loins, and he was unable to come out of his stall. It was one of the most erratic cases of the disease I have observed, the pains shifting in such an incredibly short time. Sometimes we have a very high temperature in this disease. In some cases the bowels are confined; urine always scanty and high-coloured. And such are the principal symptoms of the acute form of this disease.

Subacute Rheumatism may occur primarily, or it may be a sequence of the acute. In whatever form it occurs the symptoms are of a less intense character than the acute, and are seldom ushered in by rigors or chills; the fever is less marked, and the disease is of much shorter duration, lasting only a few days in the majority of cases. The pain may fly from joint to joint, and to the aponeurotic expansion of muscles and coverings of the brain, as in the acute form of the disease. In a few words I may dismiss subacute Rheumatism by saying it is a modified form of the acute.

Chronic Rheumatism may occur either as a primary disease from the same causes which produce the other forms, or it may be the sequel of the acute or subacute form, or it may arise in some cases from sprains. In this form of the disease the pain is less severe but more fixed in the parts first affected, and does not exhibit the same metatastic tendency as in the other forms.

The inflammation in the articulations is more difficult of removal, and is very prone to lead to ulceration of the cartilages, eburnation of the bones, and anchylosis of the joints, and deposits of bony excrescences in the synovial membranes, and also in the occipital, cervical, dorsal, lumbar, and pelvic regions; and in many cases enlargement and distortion of the joints. Such are a few of the characters of chronic Rheumatism.

Treatment of Acute Rheumatism.—There are various theories advanced for the cure of this disease, and it is very difficult to estimate the relative and absolute value of the different measures proposed for the treatment of this disease, as it differs in its degree of intensity, also in its duration, and with

its variety of complications. I will now briefly enumerate a few of the methods of treating this disease, without entering into a discussion of their relative merits.

An early abstraction of blood was the practice resorted to by our ancestors, and which at that time was the cure for almost every disease. Bleeding still has its advocates, who believe that the character of the pulse, the extreme febrile symptoms, and the extra amount of fibrin in the blood demand it.

Some, again, adopt the purgative plan, giving also nightly small doses of calomel, colchicum, ipecacuanha, tartar emetic, and aloes, and occasionally opium, followed by salines in the morning.

Sir William Gull advocates the expectant method of treatment, to trust entirely to warmth, and good nursing and rest, and small doses of opium to complete this effect, and to do wholly without other medical treatment.

Some others advance the theory that this disease is only a phase of indigestion, and that it is to be cured by fasting, and by giving complete and continued rest to all the viscera.

The treatment adopted by Dr. Herbert Davies and other physicians consists in applying strips of cantharides plaster near every affected joint. Dr. Davies prefers good acetum lyttæ well painted in zones round the joints and close to the inflamed parts, as it gives less pain to the patient than the emplastrum lyttæ, and vesication takes place with less inconvenience to the patient.

(1) Dr. Davies states that if this blister treatment be adopted early, and before any physical signs of endo or pericarditis are developed, it saves the heart in a large number of cases from inflammatory mischief.

(2) That relief to the local pain is rapidly and permanently obtained.

(3) That the temperature falls quickly, and the frequency of the pulse is diminished, and the altered reaction of the urine.

(4) Convalescence is quickly established, as shown by the early return of the appetite.

(5) The mode of treatment, though bold, energetic, and decisive, is not remarkably painful or to be dreaded, as proved by the evidence of the patients who have been subjected to the plan.

Dr. Davies considers that it is in acute Rheumatism that the blister treatment answers best, and where a large number of joints are affected at the same time, and where, by a large discharging surface, the major part of the poison can be removed at one stroke, as he considers that the rheumatic poison is especially abundant in the neighbourhood of the joints, and is actually separated with the blister serum, and so removed from the body.

The treatment of salicin, salicylic acid, salicylate of soda, and antipyrin are the favourite medicines at present used in medical practice, and I believe have also been highly spoken of by some of our own profession. Of the salicylates, salicylate of soda is the most extensively used by medical men. One thing in its favour is that it is easier dissolved, and it is claimed for it that it prevents vegetation on the valves of the heart; but, on the other hand, salicin is said to be less liable to produce toxic symptoms, but all the salicylates are liable to do so, and if they are to be discontinued the Rheumatism is apt again to return as severe as at the first. Dr. Davies says (1) that antipyrin is as efficacious as the salicylates, while less nauseous and less liable to cause uncomfortable symptoms; (2) that it acts best in acute cases; (3) that besides its antipyritic action it directly reduces the pain by its influence on the nervous system.

The treatment of Rheumatism by salicin and its preparations, when first introduced into medical practice, was thought to be something new. You are all aware salicin is got from the bark of the willow *Salix alba*, although salicin and its preparations are new to medical practice, but ages

before the efficacy of the bark of the willow was known to Dioscorides, the Anazarbian philosopher, who flourished in the reign of the tyrant Nero. It may be interesting to give a quotation from Gerarde, the father of English Botany, who flourished in the sixteenth century, concerniug the virtues of willow bark :—

"The barke hath vertues; Dioscorides writeth, that this being burnt to ashes and steeped in vinegar, takes away cornes and other like risings in the feet and toes; divers, saith Galen, doe slit the barke whilst the Withyis is flouring, and gather a certain juyce (salicin) with which they vse to take away things that hinder the sight, and this is when they are constrained to vse a cleansing medicine of thin and subtle parts."

I remember, when salicin was first introduced into practice, reading a letter in the *Lancet* from a medical practitioner in India, who recorded a case he had there. He visited the wife of a Dutch Boer at a considerable distance, and found her suffering from Rheumatism, and for which he prescribed his usual remedies. A length of time afterwards she appeared before him in his surgery in excellent health, and he was congratulating her on the good recovery she had made under his treatment, but she said her recovery was not due to him, as she had derived no benefit from his treatment, but an old Hottentot, who had seen her, made an infusion from the bark of the willow, and from using this infusion she made a rapid recovery.

Previous to the treatment by the salicylates, alkaline treatment was held in great repute, and is still so by many of the medical, and I believe by the majority of veterinary, practitioners. I will now briefly put before you the treatment I have found most beneficial in my practice.

The first thing I do when called upon to treat a case of Rheumatism is to make arrangements for the nursing of the animal, and get some one that can be relied upon to attend the same, and the animal should be put into a stall free from any draught, in preference to a loose-box, as I prefer the patient not to be moved, and the animal to be carefully bedded, and clothing sufficient not to be oppressive, and to be of such a nature as will readily absord the sweat.

Medicinal Treatment.—If the bowels are not constipated, I prefer giving no purgative medicine, as it is apt to injure the appetite; and if I should give any, I prefer aloes. Morning and evening I give the following powder :—

℞. Pulv. Calumbæ,
„ Potassæ Nitratis āā ʒvj.
„ Digitalis, ℈ij.

And I also give pot. nit. ʒj at noon, either in a mash gruel or water.

I have also tried one of the following powders in the evening, in place of one of the foregoing :—

℞. Pulv. Chirettæ.
„ Potassæ Bicarbonatis, āā ʒvj.
„ Colchici, ʒj.

And if pain should be excessive, I give opium combined with calomel.

Local Treatment.—I make a special tincture of arnica for external use. I take of the powdered root of arnica ʒxij, and spt. vini meth. Oiv, and macerate for a week or more. And I make a liniment according to the following formula :—

℞. Tr. Arnicæ, ʒvj.
Spt. Vini Meth., ʒij.
Zinci Sulphatis, ʒij.
Aqua ad ʒxxiv.

And if pain should be very severe, I add ext. belladonnæ ʒiij to the foregoing liniment.

My directions for its use are:—Put on as much as to have the hair soaking wet, and to be hand-rubbed till the hair be perfectly dry; and the liniment to be applied every three or four hours, according to circumstances. I may add I have had excellent results from this liniment. I will record a case of recovery that happened accidentally in the human subject. A ploughman came to me requesting that I would give him a bottle of the same liniment for his shoulders which he had been rubbing on a horse I had attended. I said I was very doubtful of the efficacy of the liniment in the human subject, but I was willing to let him have it for a trial. He assured me there was no doubt about it, as he had had Rheumatism in his hands for two years, and that they were entirely better by rubbing the liniment into the joints of the affected animal; and I am happy to state his shoulders were cured, and a great many have been benefited by the same. My treatment for the subacute form of Rheumatism is the same as for the acute.

Treatment of Chronic Rheumatism.—In some cases I use the same remedies as in the other forms, and when it does not yield to these I have used calomel, pot. iodide, pot. bromide, arsenious acid, and other tonics. Locally I have used lin. camph. co., iodine, and cantharides blisters.

I will now give you the history of what I suppose to be a peculiar case of rheumatism affecting the meninges of the brain. On the 10th December, 1885, I was called to see a horse that had got his hocks damaged from having run away in a cart, the wheels having come off, and as soon as he was got hold of he was put into another cart and worked for a few hours. I found the hocks slightly bruised, somewhat swollen, with some degree of stiffness. I administered a purgative, and left for him some diuretic medicine, and ordered hot fomentations and rest. He got all right in a short time, and as he was not required got plenty of time to rest. I was again called to see him on the 5th January, 1886, he having never been out of the stable. This time I found him suffering from Rheumatism in both hocks. I prescribed for him my usual treatment, which I have already brought before you; two days afterwards he was observed to sweat at the hip-joints, and he was rubbed there also with the liniment. A few days after this he began to sweat along the abdomen, and about this time the pain and stiffness had left him; next he began to sweat at the withers. There was nothing further presented itself for some time, except that the hock-joints remained much swollen, for which I prescribed an iodine liniment, to be rubbed on occasionally. I was called again to see him on the 14th February, and was told he had been put into the plough, and had gone well for the first two rounds, and after that they said he was like an animal insane. When he came to the land end he would canter round in a peculiar fashion, and when ploughing would draw in a cantering manner and would have drawn untill he hanged himself; and they were very glad to get him unyoked. This was the first time they had observed he would not set back. I found him this time presenting to all appearance an animal in perfect health; pulse and temperature normal, neither pain nor stiffness, taking his food well, and would look round in quite a natural manner. The only thing observable about him, he was sweating along the top of the neck and at the root of the ears; and I found on trying to set him back in the stall, it was impossible to do so; and the more one tried to do so the more he pressed his head forward into the corner. Again, at other times, when trying to set him back, he would get quite wild, while at others he would shake and tremble, as if afraid. Another peculiarity about him, if the head collar was taken off him, and left to himself, he would set back quite natural and walk about the stable; but the moment you caught him he would maks a rush for his stall and thrust his head into the corner. I now changed my treatment, prescribing calomel for him at one time, and pot. iod. at another, and from which he appeared to be

deriving no benefit. On March 3rd I gave him a physic ball, and prescribed pot. bromide and tonics. After following this treatment for some time he was found loose in the stable one day, and to all appearance he seemed better than usual; and they had him led out of the stable, and all went well enough for a short time; but as soon as the exercise increased the circulation the old symptoms returned, and he would have walked through a hedge, against the side of a house, or anywhere else, and it was with difficulty they had him led into the stable. I called shortly after this, on the 19th March, and prescribed eight powders of chiretta, pot. nit. and digitalis, one to be given daily, and he had no more medicine until I again saw him on the 7th April. By this time I was beginning to despond of effecting a cure, and had now thought of blistering him behind the ears. I thought, in the first place, I would try the B. P. tincture of arnica internally, and which he commenced to get in ʒj doses three times daily, and I was gratified to learn that on the third morning from the commencement of this treatment they found him quite pliable to set back in the stall; and they had him taken out and gave him a little exercise. I continued the arnica treatment for a few days longer, and he was at work the first week in May, and has remained in perfect health ever since, and is still working on the same farm.

An interesting discussion followed, which was taken part in by Professor Williams, Mr. Cunningham, and Mr. Cameron.

Mr. CAMERON described a case of rupture of the rectum and passage of a calculus into the peritoneal cavity. The same gentleman also described some cases of Braxy and the supposed prevention by eating fir-tops.

Mr. FAIRBAIRN read the following communication on

Vomition in a Horse.

MR. PRESIDENT AND GENTLEMEN,—If it is not presuming too much upon your time, I will make a few remarks on a case which came under my observation lately.

The subject was a bay cob eight years old, used for harness work, rather thin in condition, which state he had been in for some time; had had frequent attacks of Colic, for which I had attended him, his coat always staring more or less.

On this particular occasion the animal had a visit from his old enemy two days previous to my being called, and was treated by his owner, and seemingly had got over it. He, however, would not eat, seemed very listless and dull, and now and again would try to vomit. This was the message sent to me, and to come out and see him.

On my arrival the following symptoms presented themselves:—The horse was standing, resting his head on the manger, nose protruding, shivering, respiration hurried, pulse 80 per minute, heart's action very weak, rectal temperature normal, persistent jumping of the jaws, and now and again he would pat with his fore feet, and when doing so he seemed to suffer great pain, the muscles of the neck twitching rapidly.

I offered him water to drink, which he partook of greedily, swallowing three or four gulps. This at once excited the involuntary action; he rose on his hind legs, struck out with his fore feet, gave a loud scream, opened his mouth, and ejected the lately-swallowed liquid, chiefly through his mouth; the head was slightly drawn downwards, and the muscles of the neck seemed to contract actively.

All this was at once produced on giving him water or gruel, which he would take at any time, always producing the same symptoms.

I had seen a horse during the act of emesis before, but never did I witness

such intense agony as this poor brute evidently suffered. If ever I wished to relieve animal pain it was at that moment, but somehow I felt that I had before me something out of my control. I could distinctly recognise that haggard and anxious expression of countenance in his face which to us means dissolution, an expression once seen not easily forgotten, but which is very difficult to describe. I diagnosed the case as one of Œsophageal Obstruction, and thought at the same time the obstruction would probably be found at the cardiac orifice of the stomach. I could not detect any swelling down the course of the food-tube, but heard distinctly gurgling sounds proceeding therefrom. On inquiry, I elicited the animal had had nothing to eat but corn and hay. Had been doing his usual work up to the day he took Colic (two days previously).

I thought it right to pass the probang, which I did. It slipped easily down, encountering no obstruction whatever. On withdrawing the tube I observed it covered with egesta, milky-white, and which appeared to be masticated hay. I now offered him a drink of gruel, when the same agonising symptoms occurred. You will observe that medicine given by the mouth would produce the same condition. The horse was comparatively free from pain except at intervals, and that of short duration. I ordered, and soon applied, woollen cloths wrung from hot water.

My prognosis was very unfavourable. Indeed, from the first time I saw him I could see he was on his last journey. He succumbed next morning.

I made a *post-mortem* examination, and found the following:—

The *stomach* contained some semifluid material of a greenish colour, and in the cuticular portion I could discern three indentations about three-eighths of an inch in diameter, round in form. They did not penetrate deeply. These I took for ulcers. Their edges were injected, and a very little raised from the surrounding tissue. The mucous membrane over that portion of the organ showed every sign of inflammatory action. The liver was very much enlarged, of great weight. It felt firm, and when cut into, the cut surface was glistering and dry. The gland was not uniformly affected, some parts of it more easily broken down than others. I had a year before this thought this horse's liver was the seat of structural change, and consequently was not surprised to find that condition to exist. My anticipation was verified, and went a long way to account for the general unthriftiness of the animal.

I find it not uncommon in making *post-mortem* examinations of horses this condition of the liver, and what I believe to be called albuminoid or lardaceous liver.

In the œsophagus we found a great change, and a rather peculiar state of matters. The tube was very much enlarged—I should say three or four times its normal calibre. The dilatation commenced just as the tube passes through the diaphragm, and extended twelve or fourteen inches upwards; beyond and below that everything appeared normal. In the dilated portion was found egesta of a solid and semisolid consistence. The diseased portion of the tube began and ended with a distinct line of demarcation, and looked as if it had been crushed and bruised all over. I could detect nothing like stricture.

These, gentlemen, are the few hurried notes I collected with regard to this (to me) interesting case. It is certainly one the nature of which we do not meet with often.

I only ventured to bring this case before you in the hope of getting information, as I know that idiopathic disease of the œsophagus is rather rarely met with. Is it possible that the case was one of *paralysis* of that part of the canal, the food lying there acting as an irritant, producing the dilatation, effusion, red, green, and black colours of the membrane?

After the discussion which followed, Professor WILLIAMS proposed a vote

of thanks to the President for his paper and for his presence in the chair, and to Messrs. Cameron and Fairbairn for their communications, seconded by Mr. BAIRD.

This concluded the business of the meeting. ARCH. BAIRD, *Hon. Sec.*

ARMY VETERINARY ASSOCIATION.

A MEETING of the above Association was held in the Army Veterinary School on the 19th October, when a very interesting and instructive paper, by Veterinary Surgeon First Class F. Duck, A.V.D., and Veterinary Surgeon First Class F. Smith, A.V.D., was read on "Veterinary Experiences in the Armies of France, Germany, and Belgium."

PATHOLOGIGAL SOCIETY OF LONDON.

THE SO-CALLED HENDON COW DISEASE AND ITS RELATION TO SCARLET FEVER IN MAN.

AT a special meeting on the 15th December, the following discussion took place on the above subject, introduced by a paper by Professor E. Crookshank, which is published elsewhere.

Professor BROWN desired to state the position which he occupied with regard to this inquiry. When Mr. Power's report concerning the Hendon Cow Disease appeared, he criticised his conclusions on the same basis as those of any other documents which came under his notice. He found that that report was based on negation. There was absence of any evidence of contagion by human agency. If the human contagium had presented itself, Mr. Power's postulates would never have been drawn. Was it more probable that there was an undiscovered source or human contagion than that the cow herself had developed something in her system which could give rise to human Scarlatina? It had been hinted that there was some friction between the various Governmental departments, but so far from that being the case he was willing, with the sanction of the Lords of the Council, to place the whole of the resources of the Agricultural Department at the disposal of the Medical Department and of the profession generally for the purposes of this investigation. Mr. Power's report had inflicted a shock on the dairy interest, and as a result he had directed the present investigation. After a great delay he was able to get intimation of several outbreaks of the disease. The cause of the delay was partly the fear of giving information after the publication of Mr. Power's reports, and partly the fact that the veterinary surgeon rarely heard of the outbreak, the farmer simply coming to him for a pot of ointment to treat the sore teat. That the disease was looked upon among farmers as of no account was shown by the fact that the affected cows sold in the market at a fair price. A few brought to the metropolis with the disease had been slaughtered, but the majority went to mix with other herds in various parts of the country. The pock which developed on the teat was "spoilt" by the handling of the milkers, and developed into a filthy sore. In some six or seven outbreaks during the last two months (for it was very prevalent at the present time) this eruptive disease of the teat had not been coincident with Scarlatina; this might be only a singular coincidence. He did not profess to connect this disease with the Hendon Cow Disease, for he never saw the later. Recently 604 cowsheds have been inspected in the metropolis, and over 9,000 cows examined, but no eruptive disease had been discovered. His experience was that in rural districts dairy farms were often very dirty, whilst dairies in town were, as a rule, patterns of neatness and cleanliness. On the bacteriological aspect of the question he was silent, but he was unprepared to hear that this disease was really Cow-pox. It seemed desirable, from his point of view, that it should be put under the Con-

tagious Diseases (Animals) Acts, which would make it an offence to sell milk from a disease animal.

Dr. BUCHANAN said that Professor Brown seemed to take it for granted that, given two febrile diseases, each associated with a micrococcus presenting certain characters in nutrient material, the two diseases must be the same. Professor Crookshank and Professor Brown had never seen one of the diseases they affected to diagnose, and the unity of the affections had been affirmed on resemblance of some only of the characters, not all. In the Hendon cases results of the *post-mortem* examinations had been recorded, but they had heard nothing of the necropsy of Dr. Crookshank's case. His conclusion was that Professor Crookshank was in possession of some curious cases of Cow-pox arising apparently spontaneously, and the result of inoculation into human beings would be awaited with interest. He supposed there might be some varieties of this disease called by Professors Brown and Crookshank *the* disease.

Dr. KLEIN said that Professor Crookshank had compared the disease he had seen with the outbreak at Hendon on the strength of Dr. Cameron's report, but that account was based on information derived from a variety of people in different localities. Dr. Cameron says that he is informed that human inoculation has happened, but this did not occur at Hendon, for there was not a single case there of infection of a milker, and there was no fever, no primary eruption, and no vesiculation. The ulcers and sores observed on the Hendon cows were different from those on the cows from Professor Crookshank's investigation which had been placed at his disposal. The ulcers in the Hendon cows were deeper, smaller, and healed up more rapidly; in eight or ten days the crust was gone. In the Wiltshire cows there were large, irregular superficial ulcers; there was no "substance" in them, merely a slight granulating surface underneath the scab. A cow sent from Edinburgh had in its lesions greater similarity with with the Hendon than with the Wiltshire cows. The milk from the herd of Edinburgh cows had been supplied in a district in which between forty or fifty people had been attacked with sore-throat and fever. In regard to the organisms, he was surprised that Professor Crookshank said that these microbes, because they appeared to agree in certain particulars, were therefore the same thing. It was too short a time yet to judge of these differences; one would be found to grow a little slower, the colonies were a little smaller, and there were other small differences. As an illustration of this he would quote the micrococci of Septicæ, Scarlatina, Erysipelas: all behaved much alike in cultivations, but on inoculation the Septicæmic organism at once differentiated itself. There were many streptococci which, similar under the microscope, differed in rate of growth, size of colonies, opacity or translucency, and behaviour in different cultivation media. He could say positively that the organism from the Hendon Cow Disease was not the same as the organism from Professor Crookshank's cases. From cow No. 1, which had a mammary abscess, he got an organism which he planted in agar-agar, Brand's extract, and peptome mixture, but it refused to grow; whereas, the organism from the Hendon cows grew readily in such a mixture. Then, again, cow No. 1 had no visceral lesions; whereas, in the Hendon cases there was Lung, Spleen, and Kidney Disease. Professor Crookshank's cases looked much like real Cow-pox, and were most probably so; his pictures corresponded to Ceely's figures, and it would be interesting now to test and see if the calf would not take animal vaccine. Dr. Klein quoted an instance in which two horses were affected with a disease which looked like Variola Equina; the eruption healed and left no pitting. One of the grooms developed a vesicle on his thumb. Inoculation of lymph from this vesicle did not produce Cow-pox in calves, ponies, or donkeys. It was therefore a disease which only resembled Variola in some particulars. So in the present instance, though

vesiculation and ulceration were present, inoculation alone would prove the affection to be true Cow-pox.

Professor CROOKSHANK, in reply, said he had not personally observed the Hendon Cow Disease, and Dr. Klein who had made the *post-mortem* on the first of his cases had already told the result. His own account had followed as closely as possible Dr. Klein's narrative of the Hendon Disease. He had said that the microscopical appearances and characters on cultivation were identical with those of other streptococci. To his mind the evidence put forward by Mr. Power was a clever hypothesis, and Dr. Klein, by introducing the organism, had made that hypothesis a working one. He had yet to study the effect of inoculation in animals. He had succeeded in growing the organism in agar-agar and in broth. He regretted that no drawing had been published of the original Hendon Disease. On the farm from which his cases were drawn were eleven milkers; four old men had had the disease before, and did not contract it again; the other seven were lads, and had all contracted it. He would be glad to give all who were interested in the subject every opportunity of working at it. If Dr. Cameron's report did not refer to the Hendon Cow Disease, he thought some official statement to that effect should be made by the authorities of the Local Government Board.

Sir JAMES PAGET felt sure that in the future the disease could not well be overlooked. There was a great necessity that diseases in the cow should be studied by careful pathologists, and Mr. Ceely's papers and drawings would yield most valuable material for the investigation, and were deserving of the closest study.

PATHOLOGICAL SOCIETY OF LONDON.

BONE AND JOINT DISEASE IN ANIMALS.

MR. BLAND SUTTON showed some specimens of Bone and Joint Diseases. The first was the tibia and fibula of a horse, which three months before its death was kicked by a horse on the inner side of the leg over the tibia. There was a skin wound as the result of a kick, which healdd quickly, and with trifling suppuration. As soon as the wound healed, the tibia began to enlarge, and continued to do so for three months; the horse suffered considerable pain, and as the case seemed hopeless it was killed. The condition of the tibia is interesting. The bone is three times larger than it should be, and its exterior is roughened by small bony outgrowths. On section the outline of the original shaft can be defined, and outside this a large mass of new bone has been deposited; this new bone has surrounded the slender fibula, but the new formation of bone is strictly limited to the tibia. The second specimen was a greatly enlarged femur from a monkey; the bone was so extremely soft that it was divided easily with a knife throughout its length. The section is very instructive; lying in the centre is the true shaft of the femur apparently necrosed, but embedded and closely adherent to new bone, which surrounds it evenly on all sides. The adventitious bone exceeds the original shaft three times. The new bone is roughly limited above and below by the epiphysial lines; hence, though the shaft is so thick, the condyles and head of the bone preserve their proper proportions. Both femora and one humerus were affected; the remainder of the skeleton seemed normal. The tibia of the horse and the femur of the monkey were shown, because it seemed possible that they represented early stages of a rare condition described in man as Necrosis without snppuration—quiet Necrosis. The third specimen was the elbow-joint of a lion twelve years old, affected with Osteo-arthritis. The cartilage had in a great measure disappeared from the joints, and the cartilage at the periphery of the articular surfaces was distinctly "lipped"; the synovial membrane presented villous fringes of great length, and lodged in the recesses of the joint were those cartilaginous bodies so common in this affec-

tion in man. All the joints of the fore-limbs of this lion were similarly affected. The fourth specimen was a typical example of the condition to which the apt and expressive term "Lipoma Arborescens" (Muller) is applied. The specimen came from the shoulder-joint of an old man affected with Osteo-arthritis, and all stages, from simple villous processes of the synovial membrane to pedunculated masses of fat, can be clearly recognised.

Dr. NORMAN MOORE had never seen lemon-seed bodies nor lipomatous fringes in genuine gout.

Mr. GODLEE asked whether the epiphysial lines in the monkey's femur were not a little rachitic.

Mr. W. ADAMS agreed with Dr. Moore.

Mr. R. W. PARKER alluded to a specimen of Central Necrosis in children, in which a condition of chronic Osteitis obtained in the tibia.

Sir JAMES PAGET referred to a case of traumatic injury to the tibia which in the course of fifteen years had developed into a condition of genuine chronic Osteitis, presenting a spongy, light, and porous texture, the other bones not being affected.

Mr. EVE said that a dry form of Caries might explain such a condition, and due to injury.

Mr. BLAND SUTTON said that the lower epiphysial line was undoubtedly enlarged, but not like that seen in other cases of Rickets, where many bones were affected.

ONTARIO VETERINARY COLLEGE.

THE Christmas examinations of the students attending this College were concluded on December 21st, before the official Board of Examiners. The tests applied to discover the amount of knowledge possessed were practical and thorough, the whole inquiry was conducted with care, and the results were satisfactory. Twenty-four gentlemen succeeded in passing the examination, while a few were relegated to their studies for another term. The names and residences of the successful candidates are as follows:—G. Baxter, Michigan, U.S.; W. F. Broad, Sonya; W. H. Clapp, Dresden; H. Cooper, Davisville; C. O. Collins, Obolds, Pa., U.S.; R. C. Coates, Bothwell; W. H. Carpenter, Holly, N.Y., U.S.; E. E. Cunningham, La Porte, Ind., U.S.; H. Dean, Tavistock; W. A. Ewing, Newmarket; W. M. Evans, Simcoe; W. H. Huck, Mildmay; M. Kannon, Montreal, Que.; W. A. Kumpf, Waterloo; S. P. Kintner, Wooster, Ohio, U.S.; O. M. McMurray, North Baltimore, Ohio, U.S.; C. L. McLaren, Highgate; J. H. Oyler, Harrisburg, Pa., U.S.; F. Pike, Toronto; W. Shillinglaw, Staffa; R. W. Story, Princeton, Ill., U.S.; B. Taylor, Hillsborough, Dakota, U.S.; W. Thomson, Orillia; R. J. Walker, Clogher, Ireland.

G. E. Bracken, Primary on Materia Medica; R. J. Widdifield, Primary on Materia Medica.

J. H. Teller, Primary on Anatomy.

EXAMINATIONS OF THE ROYAL COLLEGE OF VETERINARY SURGEONS.

AT a meeting of the Court of Examiners of the Royal College of Veterinary Surgeons, held in London on and between December 15th to 23rd, the following students from the Royal Veterinary College were admitted members of the profession:—

Mr. H. F. Reynolds	... ...	St. Albans, Herts.
„ G. F. Brown	... ...	Hemel Hempstead, Herts.
Hon. H. F. Sugden	... ...	Bowes Park, London, N.
Mr. R. B. Aulton	... ...	Derwent-street, Derby.

Mr.	W. J. Wagstaff	Stoke-on-Trent.
„	W. J. Moran	Downpatrick, Co. Down.
„	H. Lukes	St. Austell, Cornwall.
„	J. W. Crowhurst ...	(Not yet complied with Rules of College.)
„	T. Spencer	(Not yet complied with Rules of College.)
„	J. L. Perry	Cardiff.
„	J. S. Channon	Shooter's Hill.
„	G. Reddish	London.
„	F. B. Drage	Brampton Grange, Northampton.
„	J. F. McClean	Belgravia, London, S.W.
„	W. T. Edwards ...	(Not yet complied with Rules of College.)
„	J. E. Allen	Balham, S.W.

The following passed their Second Examination :—

Mr. J. H. Bell.	Mr. F. J. Tucker.
„ T. Yarwood.	„ C. M. Seeley.
„ C. F. Hulford.	*„ J. A. Fryer.
„ R. L. Crauford.	„ R. C. Bullen.
„ A. Macvisie.	„ J. E. Shoolbraid.
„ J. B. A. Hare.	

The following passed their First Examination :—

Mr. E. R. Edwards.	Mr. C. B. Harris.
„ D. C. Clinchy.	„ H. H. Hide.
„ B. P. Boyle.	„ P. W. Creagh.
„ J. F. B. Moody.	„ A. Perkins.
„ W. C. Quinnell.	„ H. J. R. Pope.
„ F. H. Jenkins.	†„ T. Stevens.
„ F. Gale.	„ H. J. Farnham.
„ A. H. Jones.	„ A. E. Roberts.
„ W. N. Wright.	*„ A. S. Westworth.
„ S. L. Boyd.	„ J. W. Hopkins.
„ H. P. Turnbull.	„ E. J. Porter.

Marked thus * passed with great credit.
„ † „ very great credit.

ARTHUR WM. HILL, *Secretary.*

At meetings of the Scottish Section of the Board of Examiners, in Edinburgh and Glasgow, on and between December 23, 1887, and January 5th, 1888, the following gentlemen passed their Final Examination, and were admitted Members of the Royal College of Veterinary Surgeons :—

New Veterinary College.

Mr.	H. G. Weatherall	Allahabad, India.
„	J. Aitken	Loughborough, Leicestershire.
„	J. J. Toussaint	Milwaukee, U.S.A.
„	P. Young	Newport, Fifeshire.

Dick College.

Mr.	James Whyte	Nairn.
„	John Kelly	Cashel, Tipperary.
„	J. W. Logan	Cork.
„	T. Daly	Salines, Kildare.
„	J. Pottie	Paisley.

Glasgow College.

Mr.	J. McLean	Ligoniel, Co. Antrim.

The following passed their Second Examination :—

New Veterinary College.

Mr. F. W. Cosgrove.
„ J. D. Baker.
„ W. A. McDougal.
„ J. Lindsay.
Mr. C. A. Szarbinowski.
„ W. Schorn.
„ J. P. Isherwood.

Dick Veterinary College.

Mr. J. McGregor, G.C.

Glasgow Veterinary College.

Mr. H. J. Windsor.
„ C. B. Freeman.
Mr. H. Munro.
„ R. Anderson.

The following passed their First Examination :—

New Veterinary College.

Mr. J. Halliwell.
„ E. Burton.
„ D. McGregor, G.C.
„ T. Jowett.
„ W. G. Senior.
„ H. T. Bellingham.
„ G. H. White.
Mr. L. Browne.
„ J. W. Turner.
„ O. A. Ducksbury.
„ R. J. Bushnell, G.C.
„ H. Heap.
„ D. McCartie.

Dick Veterinary College.

Mr. E. Goodman.
„ P. A. McDonald.
„ H. W. Squire.
„ T. Aitken.
Mr. E. Carroll.
„ C. Byner.
„ J. Peddie, V.G.C.
„ E. Gray, G.C.

Glasgow Veterinary College.

Mr. J. K. Thompson.
„ T. Jarvie.
„ C. T. Holmes.
„ W. S. Lewis.
Mr. A. Campbell, G.C.
„ A. Miller.
„ H. Anderson.

R. RUTHERFORD, F.R.C.V.S.,
Secretary Board of Examiners.

Edinburgh, *Jan. 16th*, 1888.

THE NATIONAL VETERINARY BENEVOLENT AND MUTUAL DEFENCE SOCIETY.

THE VETERINARY MUTUAL DEFENCE FINANCIAL STATEMENT,

From January 1st to December 31st, 1887.

CASH RECEIVED.

1887.	£	s.	d.
Balance in Bank, January 1st, 1887	326	8	8
Cash in Treasurer's hand ..	2	0	0
Subscriptions in 1887	55	18	6
Bank Interest, June	2	11	5
Bank Interest, December ..	3	3	9
	£390	2	4

CASH PAID.

1887.	£	s.	d.
Dec. 31, Secretary's expenses ..	0	10	6
„ New Receipt Book	0	6	6
„ Wrappers for Notices and Receipts, etc.	1	9	0
„ Cash in Bank	382	3	10
„ Cash in hand since put into Bank	5	12	6
	£390	2	4

Audited and found correct,

JNO. B. WOLSTENHOLME.
THOMAS GREAVES, *Hon. Treasurer.*

January 11th, 1888.

The National Veterinary Benevolent Financial Statement,

From January 1st to December 31st, 1887.

Cash Received.

1887.	£	s.	d.
Balance in Bank, Jan. 1st, 1887	252	2	3
Cash in Mersey Docks . ..	1,900	0	0
Two half-year's Coupons on £1,300	50	5	4
Two half-year's Coupons on £600	22	11	7
Two half-year's Bank Interest ..	4	6	3
	£2,229	5	5

Cash Paid.

1887.	£	s.	d.
Jan. 21, Mrs. Rushall and Family	5	0	0
April 18 ,, ,, ..	5	0	0
July 26 ,, ,, ..	5	0	0
Nov. 1 ,, ,, ..	5	0	0
Dec. 31, Cash in Bank	309	5	5
,, Cash in Mersey Docks ..	1,900	0	0
	£2,229	5	5

Audited and found correct, Jno. B. Wolstenholme.
January 11th, 1888. Thomas Greaves, *Hon. Treasurer.*

List of Subscriptions to the Veterinary Mutual Defence Fund, 1887.

1887.	£	s.	d.
Jan. 2. William Whittle ...	0	10	6
,, 2. R. H. Cartwright ...	0	10	6
,, 2. Hy. Thompson ...	0	10	6
,, 2. Ralf Cox	0	10	6
,, 2. James Roe	0	10	6
,, 3. H. J. Goodall ...	0	10	6
,, 3. R. Reynolds ...	0	10	6
,, 3. B. Cartledge... ...	0	10	6
,, 3. A. H. Santy ...	0	10	6
,, 3. William Carless ...	0	10	6
,, 4. E. Faulkner... ...	0	10	6
,, 4. John Freeman ...	0	10	6
,, 4. R. C. Edwards ...	0	10	6
,, 4. John Markham ...	0	10	6
,, 4. James Storer ...	0	10	6
,, 10. William Woods ...	0	10	6
,, 10. J. C. James	0	10	6
,, 10. J. B. Taylor	0	10	6
,, 10. J. W. Anderton ...	0	10	6
,, 10. F. G. Samson ...	0	10	6
,, 10. William Roots ...	0	10	6
,, 10. T. G. Chesterman ...	0	10	6
,, 10. T. Collins	0	10	6
,, 10. W. H. Webb ...	0	10	6
,, 10. E. H. Leech ...	0	10	6
,, 10. James Beal	0	10	6
,, 10. E. Nuttall	0	10	6
,, 10. H. W. Caton ...	0	10	6
,, 10. William Elam ...	0	10	6
,, 10. R. C. Triggar ...	0	10	6
,, 10. C. Sheather... ...	0	10	6
,, 10. F. T. Stanley ...	0	10	6
,, 10. C. Morgan	0	10	6
,, 12. J. B. Wolstenholme...	0	10	6
,, 12. J. H. Ferguson ...	0	10	6
,, 12. F. D. Riddler ...	0	10	6
,, 12. B. Russell	1	1	0
,, 12. G. A. Banham ...	0	10	6
,, 12. Batt & Son	1	1	0
,, 12. F. Blakeway ...	0	10	6
,, 13. E. Meek	0	10	6
,, 15. F. Dunn	2	2	0
,, 15. Thomas Angus ...	0	10	6
,, 15. W. T. Peacock ...	0	10	6
,, 18. F. Danby	0	10	6
,, 18. S. Jackson	0	10	6
,, 19. Thomas Briggs ...	1	1	0
,, 20. D. T. Broad ...	0	10	6
,, 21. S. Secker	0	10	6
,, 21. T. D. Lambert ...	0	10	6
,, 22. F. W. Wragg ...	1	1	0
,, 31. George Rugg ...	5	0	0
,, 31. Thos. Secker ...	0	10	6
,, 31. Joseph Woodger ...	0	10	6
,, 31. G. H. Pyatt... ...	0	10	6
,, 31. Thos. Aubery ...	0	10	6
Feb. 2. Hy. Hogben ...	0	10	6
,, 5. William Broughton...	0	10	6
,, 5. J. S. Carter	0	10	6
,, 6. G. A. A. Oliver ...	2	2	0
,, 9. G. Moir	0	10	6
,, 12. E. Hodgkinson ...	0	10	6
,, 12. A. Over	0	10	6
,, 12. Hy. Oliver	0	10	6
,, 12. R. Mackinder ...	1	1	0
,, 26. W. Cawthorn ...	0	10	6
Mar. 2. J. & A. Lawson ...	1	1	0
,, 15. Ball & Son	1	1	0
,, 17. T. Walley	0	10	6
,, 18. T. A. Dollar ...	0	10	6
,, 22. H. Ferguson ...	0	10	6
,, 28. A. L. Gibson ...	0	10	6
April22. Philip Deighton ...	0	10	6
May 13. W. Dobie	1	1	0
Aug. 4. George Newsom ...	0	10	6
,, 16. Thomas Cave ...	0	10	6
Oct. 29. Thomas Pratt ...	0	10	6
Nov. 14. G. H. Darwell ...	1	1	0
,, 24. Peter Taylor ...	0	10	6
,, 24. W. A. Taylor ...	0	10	6
Dec. 21. J. L. Barling ...	0	10	6
,, 21. T. Greaves	0	10	6
,, 21. George Morgan ...	0	10	6
	£55	18	6

Audited and found correct, Jno. B. Wolstenholme.
January 11th, 1888. Thomas Greaves, *Hon. Treasurer.*

Army Veterinary Department.

First-class Veterinary-Surgeon C. W. Gillard has left the Thirteenth Hussars for a tour of service in India, being succeeded in the regiment by First-class Veterinary-Surgeon S. Gillespie. First-class Veterinary Surgeon J. D. Edwards has been posted to the Tenth Hussars, ditto R. Moore to the Twelfth Lancers, and Veterinary-Surgeons R. Pringle to the Royal Scots Greys.

Some months ago, a mission was sent by Her Majesty to the King of Abyssinia, with a view to establish friendly relations between him and the King of Italy. The chief of the mission was Mr. Portal, and Veterinary-Surgeon Beech, of the Army Veterinary Department, who has for some years been attached to the Egyptian army, was the only European who accompanied him. After much fatigue and many adventures in Abyssinia, they reached the Negus, and their return to the coast was marked by extreme hardships and a narrow escape from being murdered, the interpreter (an Abyssinian) losing his life. A long account of their travelling and adventures is given in the *Standard* of January 9th, in which our colleague is alluded to as Major Beech. He appears to have played a very praiseworthy part in the mission, and to have, on more than one occasion at least, saved it from destruction.

Obituary.

First-class Veterinary Surgeon E. T. Cheesman, Army Veterinary Department, died at Chatham on January 2nd, after a few days' illness from acute Bronchitis, aged fifty years. Though his name appears in the Army List as having joined the service in 1867, yet he entered several years before, and retired in order to accept a civil appointment in India. This not proving satisfactory, he again joined the army in the year just mentioned. Serving in the 9th Lancers and the 5th Dragoon Guards, a few years ago he was transferred to the Army Veterinary School at Aldershot, where he filled the post of instructor until the middle of last year, when failing health led to his relinquishing it, and he was consequently stationed at Chatham. Possessed of much ability, of great integrity, and courteous and obliging, Mr. Cheesman was much esteemed by his professional colleagues in the service, as well as by his brother officers in the regiments in which he served. He graduated in 1859, and became a Fellow of the Royal College of Veterinary Surgeons in 1883.

The army has sustained another serious loss by the death, on January 19th, from Erysipelas, arising from an accident, of Veterinary-Surgeon G. Aitken, who was attached to the 16th Lancers, stationed in Dublin. Like Mr. Cheesman, Mr. Aitken served a short time in the army and then retired, but rejoined again in 1880. He was an excellent practitioner, zealous in the discharge of his duties, and highly esteemed in his regiment, being a special favourite with all his brother officers, who greatly lament his death. His professional brethren, to whom he was known, entertained the greatest friendship for him, his genial disposition, sincerity, and ability, gaining for him their admiration and respect. He served in the Soudan campaign (Suakim), and was in possession of the medal and clasp and bronze star. Graduating in 1868, Mr. Aitken was only thirty-nine years of age. He received a very imposing military funeral, in testimony of the high regard in which he was held by the Dublin garrison and civilians.

Death has also removed from among us a very worthy and much-respected veterinary surgeon in the person of Mr. William Broughton, F.R.C.V.S., of Leeds, in his fifty-seventh year. He died of Syncope, attributable to Heart

Disease, on the 4th January. He had been a Vice President of the Council, and President of the Yorkshire Veterinary Medical Society; for twenty years he was its honorary secretary, and was a prominent and unswerving supporter of these medical associations from their infancy to the hour of his death. Although a man of unassuming and unobtrusive manners, he was highly esteemed by all who knew him; his clear views, common sense on all matters appertaining to his profession, were always highly valued, and he will be greatly missed by the members of the Yorkshire Society, and by his professional brethren generally. He graduated in 1852.

The Registrar of the Royal College reports the following deaths:—

J. Wright, M.R.C.V.S., Burnham Market ...	graduated	1849
J. E. Pitt, M.R.C.V.S., Birmingham	"	1879
E. T. K. Quickfall, M.R.C.V.S., late of Toronto	"	1858
J. Wyper, M.R.C.V.S., Glasgow	"	1880
W. F. Cross, M.R.C.V.S., Battersea	"	1853
C. Hutson, M.R.C.V.S., late Lincolnshire ...	"	1838
Forrest Barclay, M.R.C.V.S., London	"	1860
G. Wyper, M.R.C.V.S., Donnington	"	1855
F. Cupiss, M.R.C.V.S., Diss	"	1822
P. E. Carter, M.R.C.V.S., East Dereham ...	"	1842

Jurisprudence.

APPEAL UNDER THE CONTAGIOUS DISEASES (ANIMALS) ACT.

An appeal, brought by Joseph McCauley, veterinary surgeon, of Carlisle, against the Haltwhistle justices and another in respect of a conviction under the Contagious Diseases (Animals) Act, was heard recently at the Northumberland Quarter Sessions. Mr Cavanagh, of the Northern Circuit, who was specially retained, and Mr. Blake, instructed by Mr. Johnson, of Carlisle, appeared for the appellant; and Mr. J. Strachan and Mr. Hugh Boyd, instructed by Mr. Evan Sanderson, appeared for the respondents, who were the Haltwhistle justices and P.C. Peter Spratt, under whose information the appellant was prosecuted.

Mr. Sanderson (Clerk of the Peace) read the record of the conviction, showing that, on the 29th of September, 1887, Joseph McCauley, veterinary surgeon, was convicted at the Haltwhistle Petty Sessions of having, at Greenhead, aided and abetted George Tweddell in the commission of an offence punishable by summary conviction, to wit—in the removal to the county of Northumberland from the county of Cumberland of twenty-three heifers, in contravention of regulations duly made on the 5th of May, 1887, by the Local Authority of Northumberland, by virtue of a Privy Council order; and that he was ordered to pay a fine of £10, and to pay to the informant, Peter Spratt, £1 and costs.

Mr. Cavanagh respectfully submitted that, although he would be only too happy that Mr. Sanderson should advise the Bench in that case, he ought not to do so, for this simple reason: that he appeared as prosecutor, no doubt in the discharge of his duties, before the magistrates. He did not wish it to be inferred that he believed Mr. Sanderson would take any undue advantage of his position; he made his objection as a matter of principle.

The Chairman said Mr. Sanderson would not be consulted on any point which involved his discretion.

Mr. Cavanagh objected to the conviction on two grounds, but his objections were over-ruled.

It was decided to hear the respondent's case first; in effect, to re-hear the case from the beginning.

This having been done, the Chairman intimated to Mr. Cavanagh that the Bench was against him, and must uphold the decision of the Haltwhistle Bench.

Mr. Cavanagh asked the Bench to grant him a case on the points he had mentioned.

The Chairman said he would not like to put his pen to paper to any statement that he had any doubt in the matter.

Mr. Cavanagh said he was quite willing that all the blame and responsibility should be thrown upon him.

The Bench, after some discussion, refused to grant a case for appeal. The question of taxing the costs of the case was referred to the Clerk of the Peace for Cumberland.

Notes and News.

MORBID APPETITE OF AN ELEPHANT.—Barnum's elephant Alice, Jumbo's illustrious consort, has been dissected at Bridgeport, Connecticut. In her stomach were found 300 pennies, part of a pocket-knife, four walking-stick ferrules, and a piece of lead pipe.

TOXICITY OF PULMONARY EXHALATIONS.—Does the surface lining of the lungs give off a toxic substance like the general run of glandular surfaces? MM. Brown-Séquard and d'Arsonval reply to this question in the affirmative and as the result of direct experiments performed on rabbits. If a certain quantity of water be injected into the lungs of an animal and then be immediately withdrawn, and after filtration injected into another animal, phenomena of poisoning are observed. A considerable diminution in the breathing is the chief observation, and this is attended with dilatation of the pupils. The animal died in seven hours. At the necropsy cerebral anæmia was noted, and serous effusion into the ventricles and at the base of the brain. There were no signs of embolism; the heart was contracted and the cavities on both sides contained black blood; the blood was red in the inferior vena cava, but black in the superior. Expired air contains something more than gas and water—a fact which needs in itself no further attestation than that supplied by the olfactory sense.

EFFECTS OF PHOSPHORUS ON YOUNG ANIMALS.—Dr. Alexander Kisel, of St. Petersburg, who has made a series of observations on the effect of small doses of phosphorus on young animals, has found that it never exerts any beneficial effect on the growth of bone, but that, on the other hand, the apparently slight disorder of the digestive functions which very small doses produce is liable to result in death. When given to puppies in doses of 0·0001 gramme per kilogramme of weight, symptoms of chronic poisoning were produced, with atrophy and disintegration of the bones. In doses of half this amount the development of the animal was retarded, but those equal to 0·000033 gramme per kilogramme of weight appeared to be innocuous and produced no effect at all upon the body.

PASTEUR'S METHOD SIMPLIFIED.—Dr. Högyes, of Buda-Pesth, has published in the *Orvosi Hetilap* an account of some researches he has made on the protection of dogs from Rabies by a somewhat simpler method than that employed by Pasteur. He, too, makes use of the spinal cord of an infected rabbit, but, instead of drying it to a gradually increasing extent to obtain various degrees of activity, he merely rubs it up with water containing chloride of sodium, so as to make solutions varying in strength from 1-10th to 1-5,000th. The dog to be protected is injected successively with these, beginning with the weakest. The results appeared to be quite satisfactory, and a complete immunity from Rabies to be secured by six of these injections.

RICKETS IN LIONS.—At a recent meeting of the Pathological Society, Mr. Bland Sutton exhibited specimens illustrating a peculiar effect of Rickets upon the skulls of lions. Last session he showed some similar specimens, in which the bones of the skull pre-formed in membrane were those most affected in Rickets; this applied to all mammals. The carnivora possess an ossified tentorium which normally is of the thickness of writing paper. When the skull is thickened by Rickets this bony tentorium is also affected, the enlargement giving rise to pressure symptoms and some curious effects on the brain. The specimens previously exhibited showed the changes which occur in the brains of cubs; the enlarged tentorium presses upon the vermiform process of the cerebellum, and this compression occludes the fourth ventricle and intercepts the inter-ventricular communications leading to Hydrocephalus, with well-marked symptoms, general Paralysis, and death. When the thickening of the tentorium occurs at a later date the effects upon the brain are somewhat different. The large tentorium presses upon the vermiform process of the cerebellum and obliterates the fourth ventricle, but instead of causing extreme dilatation of the third lateral ventricles in the cub, we find these cavities are but little larger than usual. The effects upon the floor of the fourth ventricle are somewhat different, for an examination of the cerebellum and medulla in longitudinal shows that the abnormal pressure of the vermiform process causes erosion of the floor of the fourth ventricle, and in one of the specimens this portion of the cerebellum is accommodated in a distinct shallow groove. The differences may be accounted for by the unyielding character of the cranium at the age of two years in lions as compared with the accommodating nature of the sutures and fontanelles in the cub. The lions from which the specimens were obtained were paraplegic for many weeks before death, and in one the tail became gangrenous and sloughed. On the hind limbs were three large ulcers comparable to bed-sores. In reply to Sir James Paget, he said that Rickets was not found in animals in the wild state. John Hunter's specimens were probably obtained from menageries. An extinct form of whale (Pachycanthus), found in a large tract of country near Vienna, was shown by Paul Gervais to have signs of Rickets, and with a remarkable narrowing of the spinal canal to a mere chink.

CHRONIC GLANDERS SIMULATING SYPHILIS.—Dr. Sakotski, writing in the *Meditsinskoe Obozrênie*, describes the case of a young soldier who suffered from ulceration of the palate, which extended into the nasal cavity, and destroyed the inferior turbinated bones. This was followed by a tumour of the eyebrow, by pains in the knee and ankle, suppuration of the left ear, and a metastatic abscess on the back of the right hand. There was at times some evening pyrexia. The case was looked upon as probably syphilitic for about two years. Then nodules and œdema began to appear on the face, and it was believed that it was Glanders. After death, which was due to exhaustion, Dr. Vigandt made a microscopical examination of sections of the nodules, and also examined the ichor from the ulcerated surfaces, finding bacteria resembling those described by Löffler and Schutz, but he was unable to prove them to be the true cause of Glanders.

RUSSIAN ARMY HORSES.—The *Esercito Italiano* (Rome) gives the following statistics of the horse effective of the Russian Army:—The Regular Army comprises 1,530 officers' chargers and 52,729 troop horses. Of this number, 2,079 have served twelve years, and 5,326 ten years. There are thus 7,405 horses almost unfit for service, although the budget of next year provides only for 5,240.

DOMESTIC ANIMALS IN SIBERIA.—According to a foreign exchange "there are in the Ob and Irtish region of western Siberia about 2,000,000 horses,

1,500,000 head of horned cattle, 3,000,000 sheep, and 100,000 reindeer. For eastern Siberia the figures are approximately 850,000 horses, 1,100,000 horned cattle, 1,120,000 sheep, 50,000 reindeer. In western Siberia the Siberian plague makes great ravages, and the average losses are estimated at about 37,500 head of cattle annually."

M. PASTEUR.—Owing to continued ill-health, M. Pasteur has thought it necessary to offer to resign his post of perpetual secretary to the Academy of Sciences; but as the eminent biologist is held in great esteem, his application has not been granted, and he has been requested to continue in office with a *locum tenens* to do his work.

RABIES AND HYDROPHOBIA.—According to the recently-issued report on vital statistics relating to England and Wales, it appears that the deaths from Hydrophobia, which had risen in 1885 to 60—a higher number than in any year with the exceptions of 1874 and 1877—fell in 1886 to 26, and were fewer than in any year since 1869. Of these 26 deaths 10 occurred in London, while the remaining 16 were distributed as follows: Devonshire, 1; Derbyshire, 2; Cheshire, 2; Lancashire, 6; West Riding, 5. This distribution tallied pretty closely with previous experience, Lancashire and Cheshire being the counties that are found on an average of many years (1864-86) to have had the largest number of deaths from this disease in proportion: their populations, and the West Riding and Derbyshire also standing high up in the list. Could a census be taken of stray curs, the cause of this distribution would probably be apparent. In London, at any rate, the destruction of over 30,000 stray dogs in the nine months beginning with November, 1885, and the compulsory muzzling of all other dogs in the streets, appears to have been most efficacious; for while in 1885 the deaths from Hydrophobia registered in London had risen to the unprecedented number of 26, in 1886 they fell, as before stated, to 10; and of these 10, 6 were registered in the first quarter, 2 each in the second and third quarters, and none in the last three months of the year.

HORSE SYPHILIS IN THE UNITED STATES OF AMERICA.—Referring to what we have already published regarding the disease among horses known as *Maladie du Coit*, which has caused the quarantine and slaughter of a number of animals in De Witt County, Illinois, it is stated in the *Northwestern Live Stock Journal*, Cheyenne, as follows:—"We cautioned the public against buying horses that came from any infected locality, because it is almost an impossibility for even an expert to detect the disease in its first stages. That warning was given none too soon. To-day its loathsome presence is found in Montana, where the importation of a stallion from Washington Territory last year caused the spread of the disease to such an extent that over fifty cases have been found, and a number of them have died. The others are in quarantine and will be killed. Kansas has a number of cases, and reports that seem worthy of credence announce its presence in California. We have no information from Washington Territory that locates the disease there at present, but the stallion that spread the disease in Montana came from Washington Territory, and undoubtedly took it in that section. The presumption is that there are other cases there, for the disease is only transmissible by copulation. How widely scattered the disease is already is a matter of great uncertainty, because it existed in McLean and De Witt counties, Illinois, for nearly two years before its identity was established, and during that period a number of animals were sold to go into remote sections of the country. Undoubtedly some of these have given off the plague."

PRESENTATION TO SIR HENRY SIMPSON.—Prince Christian, on behalf of the subscribers, presented at the Windsor Guildhall, on January 14th, an

address and silver dessert service to Sir Henry Simpson, the former Mayor. The testimonial, which cost upwards of 200 guineas, was given by many of the inhabitants of Windsor and the neighbourhood in recognition of the recipient's untiring and successful services in promoting and carrying out the scheme to commemorate the Queen's Jubilee.

ELECTRICITY AS A GALACTOGOGUE.—For some time various Continental veterinary surgeons have recommended Faradisation as a means of restoring or stimulating the mammary secretion, and some very interesting and probable instances of success have been cited, showing that at the end of a few applications the mammary gland has resumed its function with remarkable vigour. But this mode of treatment is not so novel as some believe, so far as the human species is concerned; for in the *Bulletin de Therapeutique*, M. Misrachi proves that the idea of stimulating the mammary secretion by means of electricity is at least thirty years old, and was first started by M. Aubert, of Mâcon; Misrachi, however, gives an instance in which the secretion was completely restored in two days by Faradisation, after it had been entirely suppressed.

Correspondence.

THE PRINCIPALSHIP OF THE ROYAL VETERINARY COLLEGE.

SIR,—The lamentable and untimely death of Professor Robertson will doubtless produce a feeling of profound regret throughout the profession, and more especially to those who were privileged, like myself, to enjoy his personal friendship. That the deceased gentleman did much for veterinary science during his principalship every member of the profession must admit, and his good works will follow him. Now that he has passed to his rest, the question naturally arises as to who will be elected to fill the honourable position he occupied. To my mind it requires very little consideration to arrive at a satisfactory conclusion, the gentleman I shall name being proclaimed on all hands the one most able and suited to follow Professor Robertson, viz., Professor Wortley Axe. It is well known that for twenty years this gentleman has been connected with the Royal Veterinary College, filling the various and arduous positions of Demonstrator of Anatomy, Lecturer on Anatomy, Histology, General Pathology, Morbid Anatomy, and Clinical Medicine. He was the first to institute Histology, General Pathology, and Morbid Anatomy, as a part of the College instruction, and not only to institute these subjects—but generously for some years he absolutely taught them gratuitously until they were made a part of the curriculum. The present admirable system of Clinical teaching was also organised by Professor Axe.

I write not as an advocate, but with the feeling that the appointment of Principal would be but a reward justly due for the invaluable aid Professor Axe has not only given to the College and its members, but also for the immense benefit the social status of our profession has received through his indefatigable efforts and scientific teaching.

As a lecturer he is too well known and admired to need any praise from my pen. Suffice it to say on this point he is *par excellence*.

His wide knowledge of agricultural matters and stock management has alone made his name prominent in this and other countries.

Universally esteemed by his brethren, a general favourite with the students, a hard worker and deep researcher, with "Forward" for his motto, I venture to think upon no man's shoulders would the Principal's cloak fall with greater satisfaction to the profession and public appreciation than upon those of Professor Axe.

If his twenty years' hard services, which have been rendered faithfully and

well, are worth anything, they are worth a suitable reward. Were the voice of the profession taken, it would be *Palmam qui meruit ferat* ("Let him bear off the palm who has earned it,") and no living veterinary teacher has better acquitted himself than Professor Axe.

Hastings. J. WOODROFFE HILL, F.R.C.V.S.

TRICKY TITLES.

SIR,—I have every respect for the Royal Veterinary College Veterinary Medical Association. I believe, in common with others, that it becomes the means of much useful interchange of knowledge, and by its discussions on the various papers brought before it fresh ideas are developed, and very often old errors exploded. I also think it a good practice to distinguish the man who reads and defends a paper by some other designation than that of Member; and I suppose it is to a general feeling of this nature that we must attribute the adoption of the honorary title of Fellow. So far, so good; but it is here that some confusion seems to creep in. Many students appear to have an idea that when this fellowship is obtained, they are the happy possessors of a brand new degree; and in certain cases which have come under my notice lately they cherish this delusion after they become members of the profession, and then we read of Mr. So-and-So, M.R.C.V.S. and F.V.M.A. As I before remarked, this must simply be a mistake on their part. I am far too charitable to suppose they wish either to humbug the public, or to obtain an unfair advantage over a more modest practitioner, who is content with his legal qualification. Taking these views of the matter, I think it would be well if the president of the R.C.V.M.A. made the bearings of this subject very clear to the present members, and that the secretary be instructed to communicate with those past or present members who make use of the title F.V.M.A. There must be some limit or else these gentlemen who, quite in ignorance, begin with F.V.M.A., might blossom into L.I.A.R. (living in the Argyle-road, or Argentine Republic), and so on *ad infinitum*.

Apologising for taking up so much space on such a little matter,

E. A. HOLLINGHAM, M.R.C.V.S.

Tunbridge Wells.

THE FLESH OF TUBERCULOUS CATTLE.

DEAR SIR,—I enclose you a report of seizure of diseased meat at Workington, from *West Cumberland Times*, of January 14th, 1888.

As many of our best animals that are slaughtered for food often show most distinctly the presence of Tubercle, I would like your opinion whether the carcase is fit for human consumption when the flesh sets firm and is of a good colour? *Cumbrian.*

SEIZURE OF DISEASED MEAT AT WORKINGTON.

The attention of the Local Board officials was called to a carcase of beef at the slaughter-houses on Tuesday night by the owner of the beef, Mr. H. Shackley, butcher, Workington. Dr. Highet, Mr. Warwick, and Mr. Eaglesfield on Wednesday morning examined the beef. The entrails, from a cursory examination, showed that the animal when living had suffered from what is locally known as "Clyred"; but from the healthy appearance and hue of the meat Dr. Highet said he could not condemn it, and recommended that Mr. Soulsby, V.S., be called in to examine it, and to ascertain the nature of the disease, and whether it had extended to the system. On Mr. Soulsby's examination he found the carcase quite unfit for human food, and that the animal had suffered from Tuberculosis, and it was that gentleman's opinion that this particular kind of disease, which is one of the forms of Consumption, is quite liable to be communicated to the human frame through eating, this liability

being greatly increased when the meat is not thoroughly cooked. On his lodging this report at the Board-room, the previous owner of the animal was at once communicated with. He arrived, attended by his veterinary surgeon, Mr. Thompson, of Aspatria. The latter gentleman, having examined the animal, at once corroborated Mr. Soulsby's opinion, and pronounced it unfit for human food. The owner, Mr. W. S. Barnes, of Mowbray, refunded Mr. Shackley the purchase money, and said he would not trouble the Board to go before the justices for an order, but gave them authority to destroy the meat forthwith, Praise is due both to Mr. Shackley and Mr. Barnes for their assistance in helping the Board's officials to get the meat destroyed. This case is of peculiar interest to the public, inasmuch as beef, after being dressed from animals which have suffered from this disease, cannot be distinguished from sound, healthy meat by any but a professional eye, and as the disease is prevalent to a great extent amongst fat cattle, it would be almost desirable that where all public slaughter-houses exist the meat inspectors should be appointed from the medical profession, as by this means only can safety be insured.

[We are decidedly averse to allowing the flesh of Tuberculous cattle to be used as food, and especially in very bad cases. It is always best to err on the safe side.]

The annual meeting and dinner of the Lancashire Veterinary Association will take place at the Grand Hotel, Manchester, on Friday, February 10th—the meeting at 4.30 and dinner at 5 p.m., prompt. ARTHUR LEATHER, *Hon. Sec.*

The annual meeting of the Royal Counties' Veterinary Association will be held at the Great Western Hotel, Reading, on Friday, February 24th, at 2 p.m.

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from R. J. Dawson, San Francisco; Fred Smith, Aldershot; R. W. Burke, Jubblepore; F. F. Collins, Dublin; A. Johnston, Perth; T. Chambers, Dudley; T. W. Kendall, Melbourne, Australia; J. A. Nunn, A.V.D., Cape of Good Hope; T. Greaves, Manchester; F. C. Mahon, Southsea; A. Baird, Edinburgh; Dr. Duncan, Toronto; A. Leather, Liverpool; H. Thomson, A.V.D., Canterbury; A. W. Hill, London; R. Rutherford, Edinburgh; R. C. Edwards, Chester; E. A. Hollingham, Tunbridge Wells; F. G. Ashley, Wigton; J. W. Hill, Hastings; Sidney Villars, Harrow.

BOOKS AND PAMPHLETS: *L. Villain* and *V. Bascon*, Manuel de l'Inspecteur des Viandes; *J. H. Steel*, Treatise on the Diseases of the Dog; *C. A. Gordon*, Comments on the Report of the Committee on M. Pasteur's Treatment of Rabies and Hpdrophobia; *C. S. Roy*, *J. G. Brown*, and *C. S. Sherrington*, Report on the Pathology and Etiology of Asiatic Cholera; Report of the Bombay Veterinary College and But Sakarbai Dinshaw Petit Hospital for Animals; *A. Sticker*, Ueber die Entwicklung und den Bau des Woollhares beim Schafe; *A. C. Cope* and *V. Horsley*, Reports on the Outbreak of Rabies among Deer; *Sir James Paget*, Morton Lecture on Cancer and Cancerous Diseases.

JOURNALS, ETC.: *Quarterly Journal of Veterinary Science in India; Archiv fur Wissenschaftliche und Praktische Thierheilkunde; Der Thierarzt; Recueil de Méd. Vétérinaire; Oesterreichische Zeitschrift für Wissenschaftliche Veterinärkunde; Wochenschrift für Thierheilkunde und Viehzucht; Revue Vétérinaire; Echo Vétérinaire; Annales de Méd. Vétérinaire; Bulletin Special des Vétérinaires de l'Armée; Journal of the National Agricultural Society of Victoria; American National Live Stock Journal; Lancet: British Medical Journal; Mark Lane Express; Live Stock Journal: Edinburgh Medical Journal: London Medical Record; Hufschmied; Scientific News.*

NEWSPAPERS: *Farming World; Newcastle Daily Chronicle; Carlisle Journal.*